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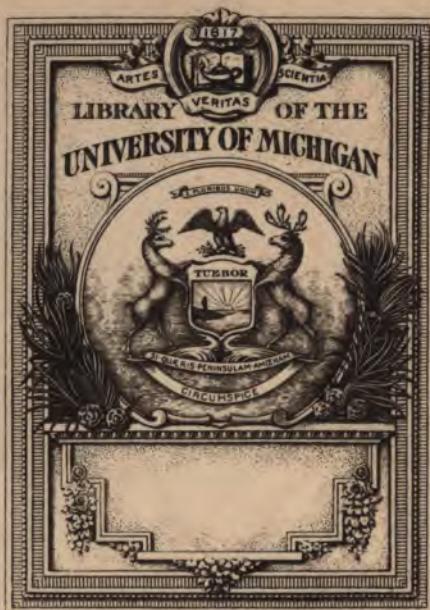
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A rectangular bookplate with a double-line border. The text "THE GIFT OF" is at the top, followed by "Tappan Presbyterian Association" in a larger, bold font.



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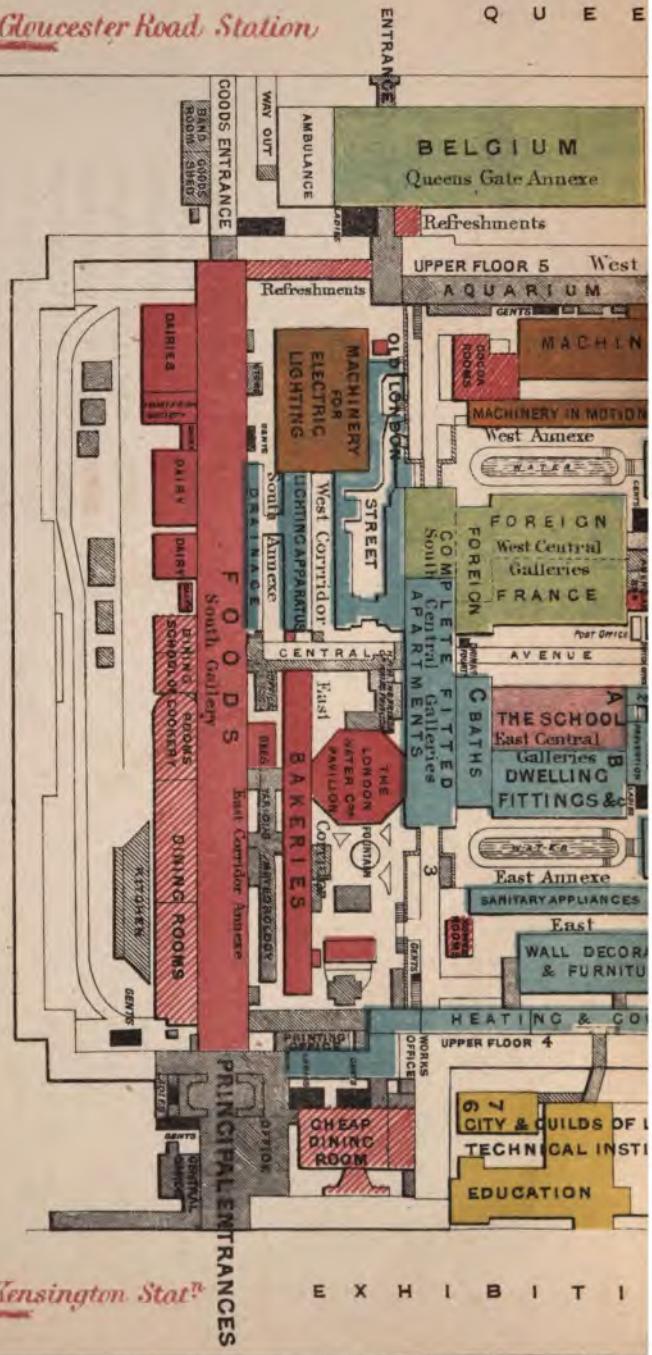
GENERAL PLAN
INTERNATIONAL HEALTH EXHIBITION, LONDON, 1884.

W^m Clowes & Sons Limited, Litho. Duke St. Stamford St. S.E.

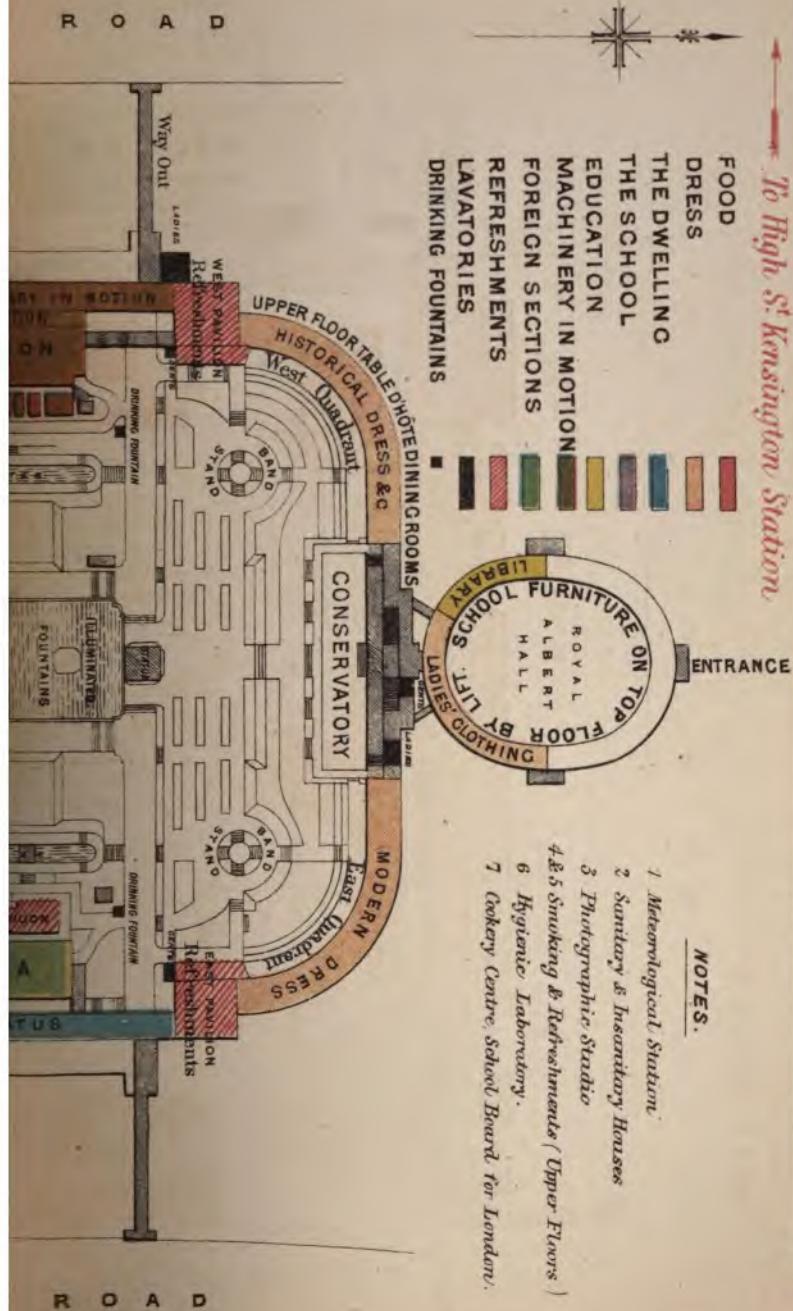
Wilson Benison Surveyor to the Executive Com

To Sth Kensington Stat^m

E X H I B I T I



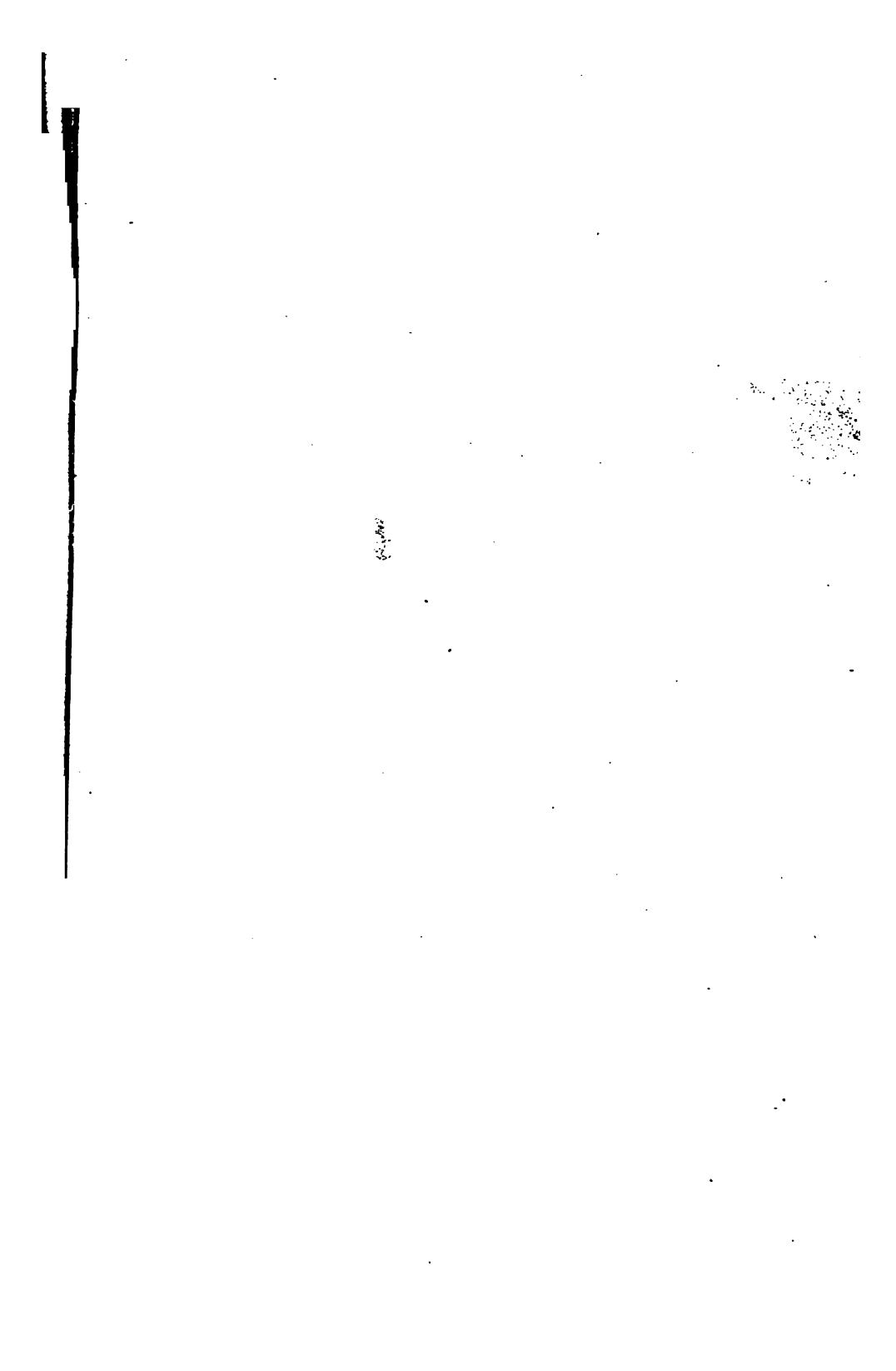
To High St. Kensington Station.

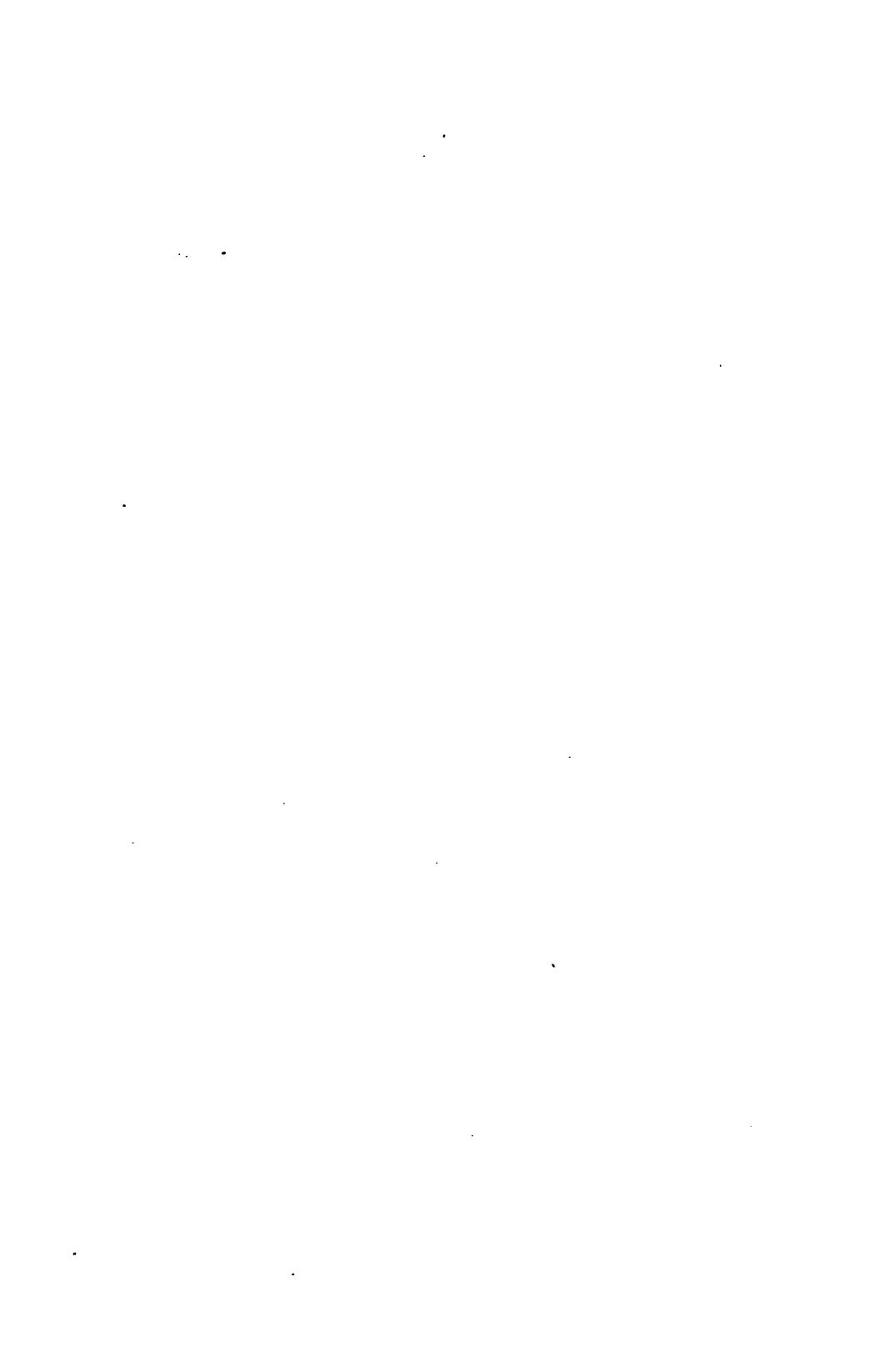


NOTES.

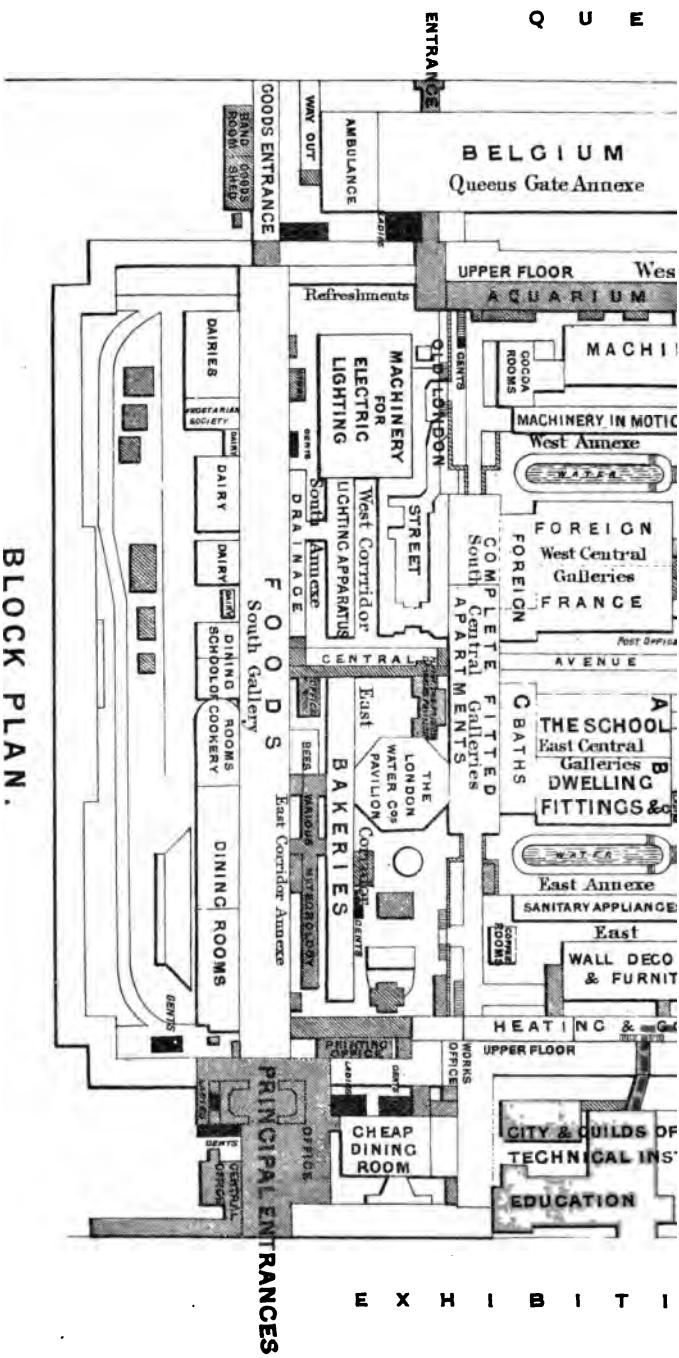
- 1 Meteorological Station.
- 2 Sanitary & Insanitary Houses
- 3 Photographic Studio

- 4 & 5 Smoking & Refreshments (Upper Floors)
- 6 Hygienic Laboratory.
- 7 Cookery Centre, School Board for London.





BLOCK PLAN.
SHOWING POSITION OF EDUCATIONAL
EXHIBITS (COLORED YELLOW.)



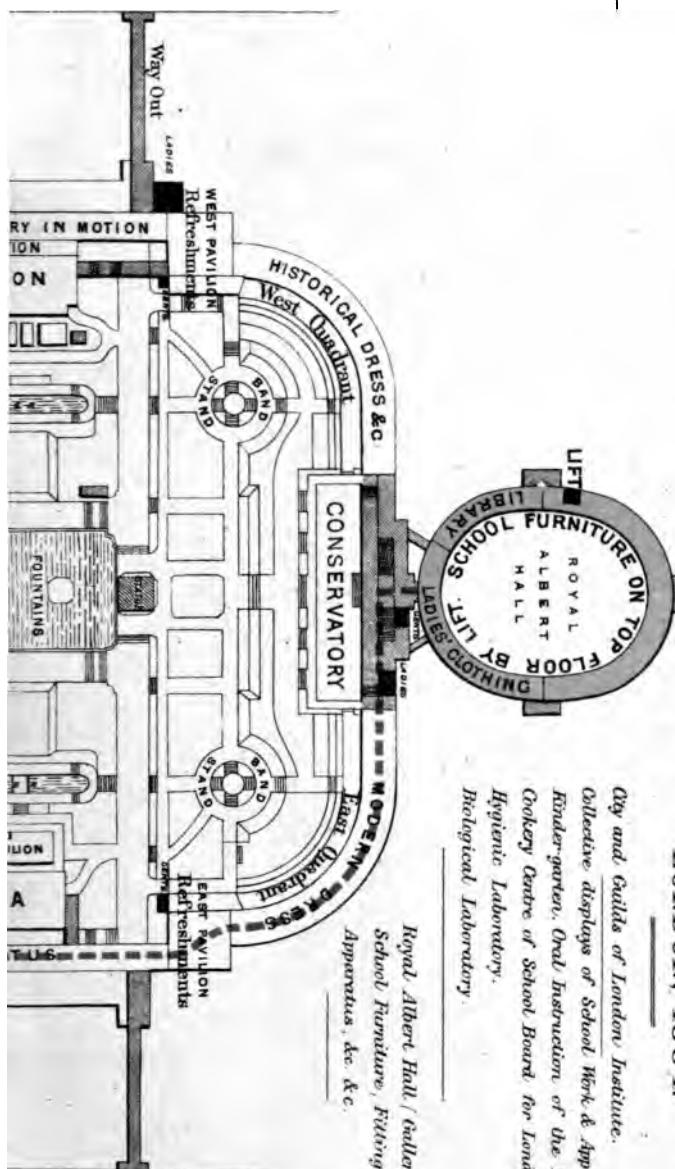
THE INTERNATIONAL HEALTH EXHIBITION. LONDON, 1884.

ENTRANCE

*City and Guilds of London Institute.
Collective displays of School Work & Appliances.
Kinder-garten, Oral Instruction of the Deaf.
Cookery Centre of School Board for London.
Hygienic Laboratory.*

Biological Laboratory.

*Royal Albert Hall (Gallery)
School Furniture, Fixtures,
Apparatus, &c. &c.*





New Building on the site of the former Government Laboratory for Technical Education, Exhibition Road, South Yarra.





London INTERNATIONAL
HEALTH EXHIBITION
1884. *Education division*

SPECIAL
CATALOGUE
OF THE
EDUCATION DIVISION.

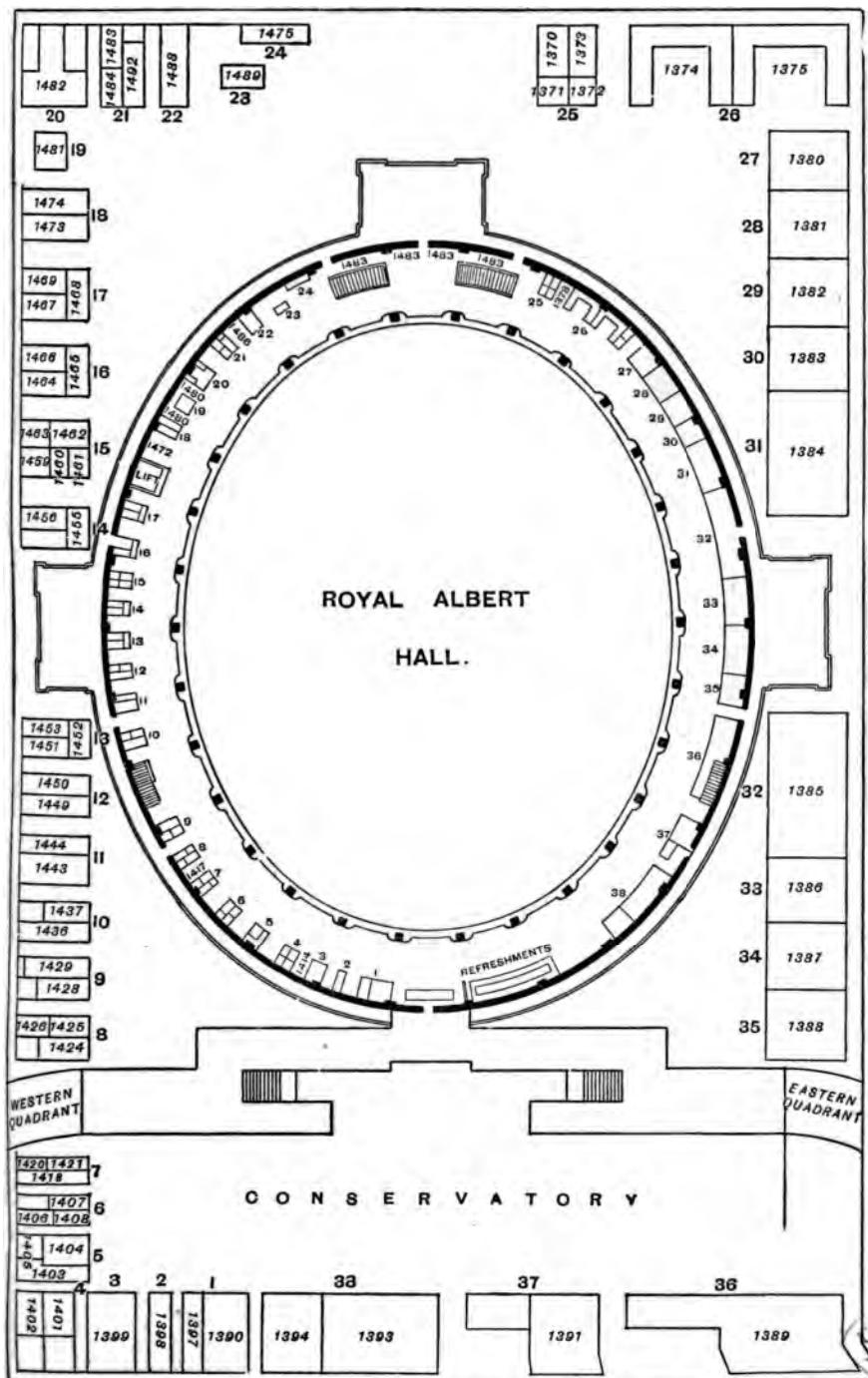
SECOND EDITION.

LONDON:
WILLIAM CLOWES AND SONS, LIMITED,
INTERNATIONAL HEALTH EXHIBITION,
AND 13, CHARING CROSS, S.W.

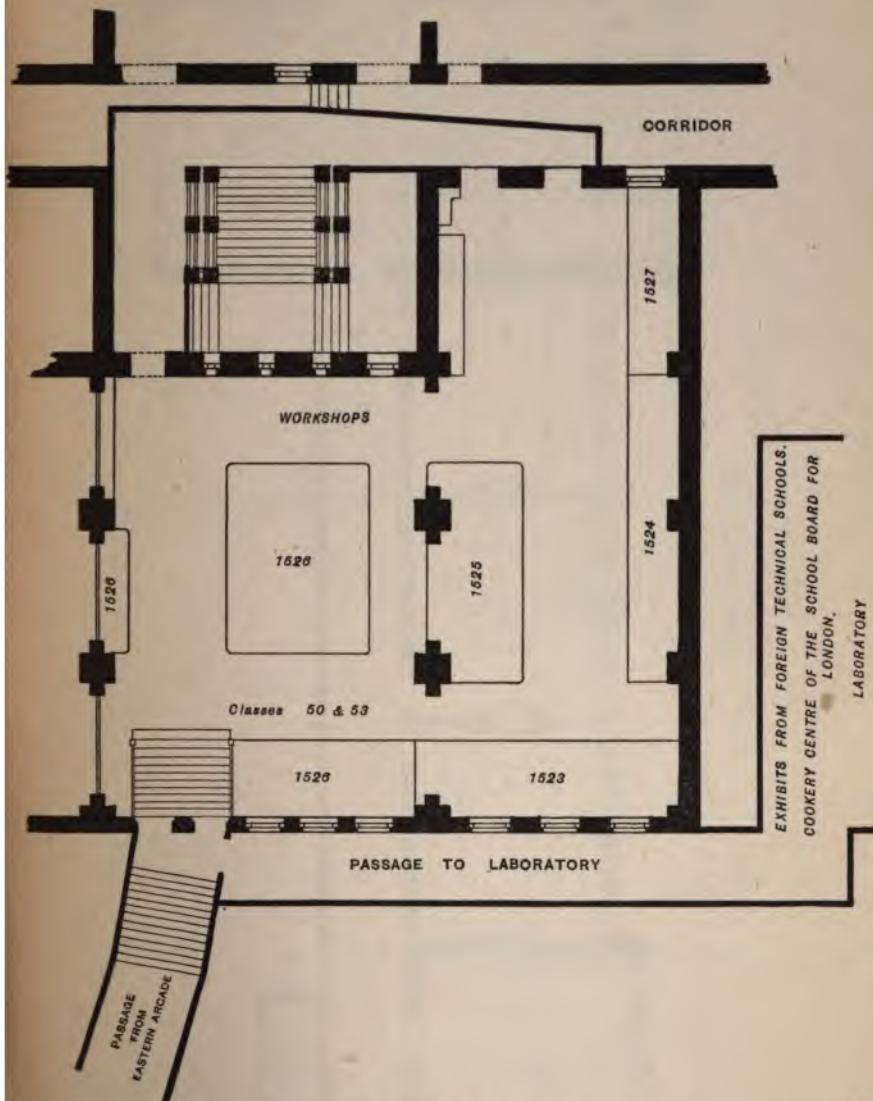
1884.

LONDON :
PRINTED BY WILLIAM CLOWES AND SONS, LIMITED
STAMFORD STREET AND CHARING CROSS.

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1884.



PLAN SHOWING POSITION OF EDUCATIONAL EXHIBITS IN THE UPPER GALLERY OF THE
ROYAL ALBERT HALL.

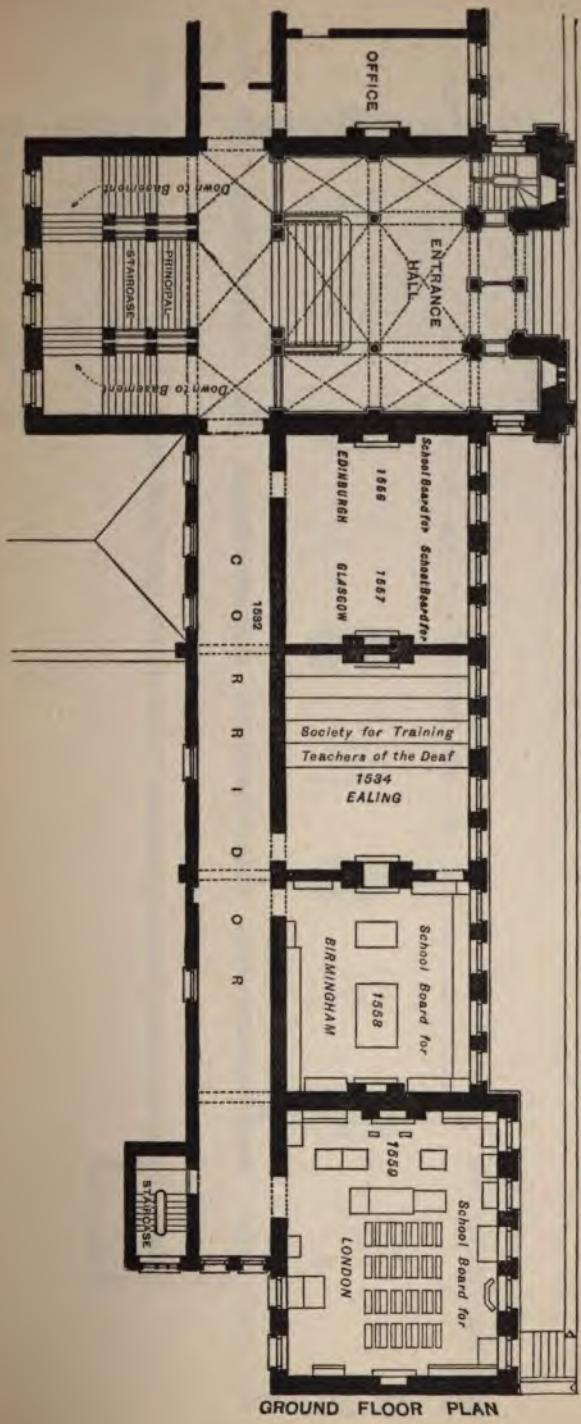


CITY AND GUILDS OF LONDON INSTITUTION.
(*Basement Plan.*)

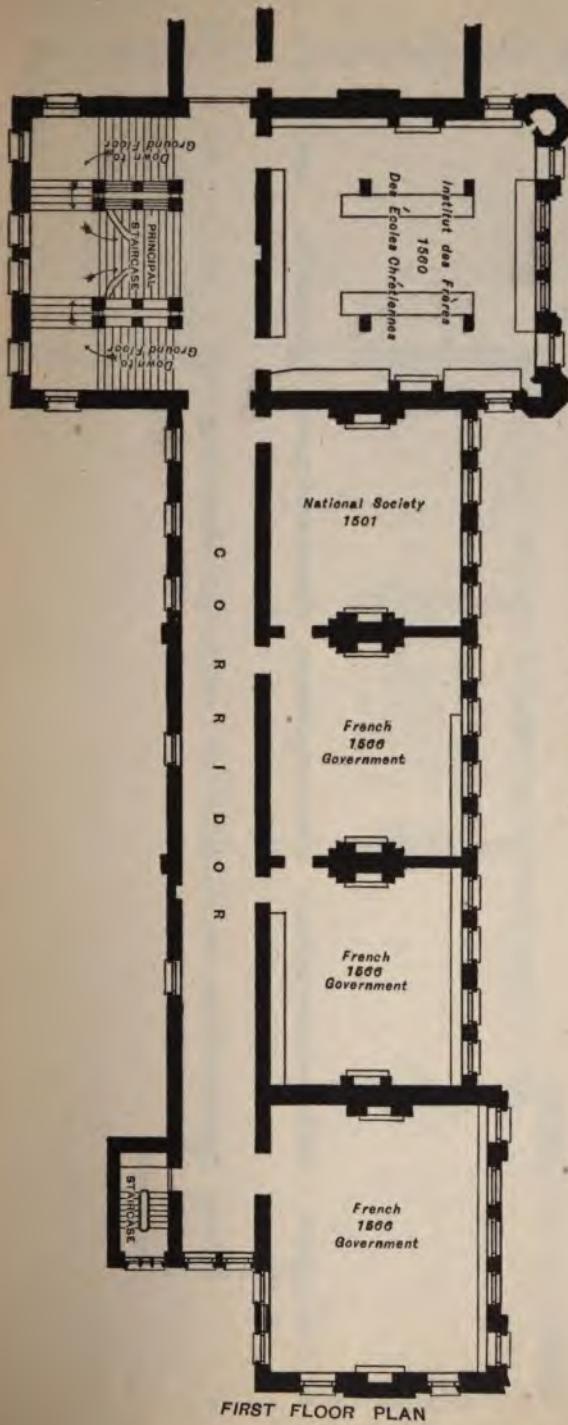
EXHIBITS FROM FOREIGN TECHNICAL SCHOOLS.
COOKERY CENTRE OF THE SCHOOL BOARD FOR
LONDON.
LABORATORY



CITY AND GUILDS OF LONDON INSTITUTION.
(Ground Floor Plan.)

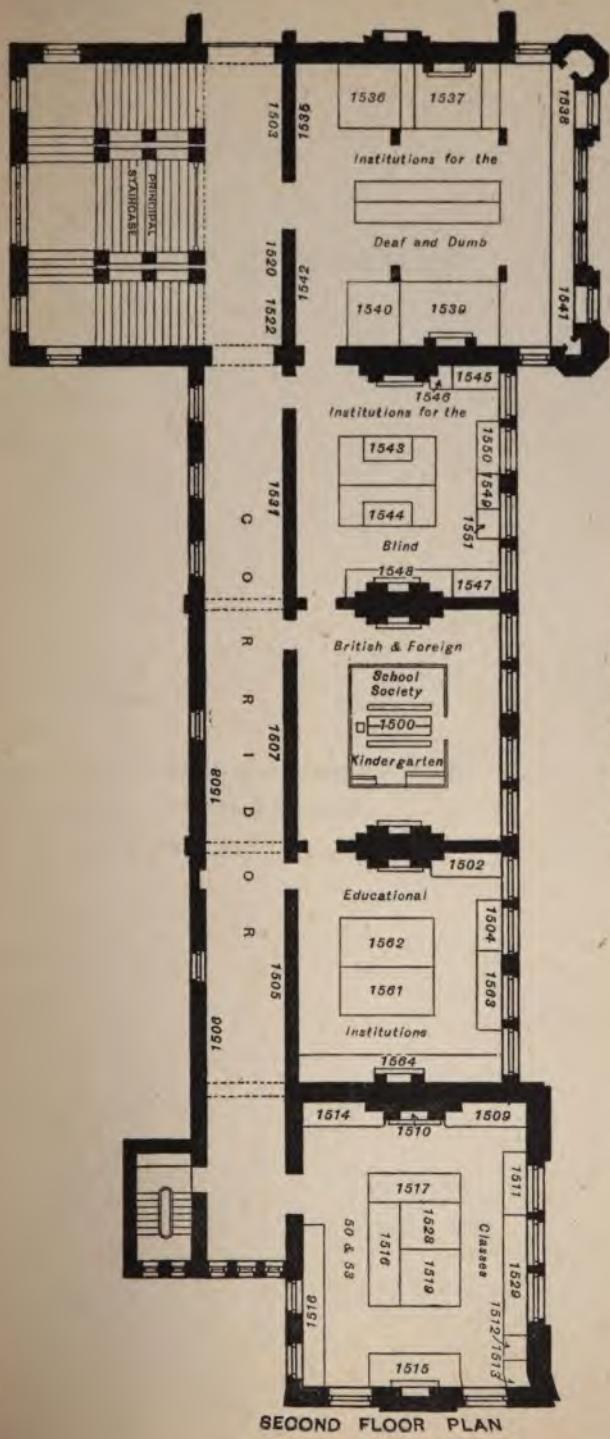


CITY AND GUILDS OF LONDON INSTITUTION,
(First Floor Plan.)



CITY AND GUILDS OF LONDON INSTITUTION.

(Second Floor Plan.)



Gift
To Agapan Red. Assoc.
3-25-1933

CONTENTS

	PAGE
Regulations	xvii
Vice-Presidents	xxv
Executive Council	xxvii
Jury Commission	xxvii
General Committee	xxviii
Sub-Committees	xxxiii
Executive Staff	xxxv
Foreign Commissions	xxxvii
Memoranda for Exhibitors	xl
List of Handbooks	xlv
Introduction to the General Catalogue of Educational Exhibits	xlvi
City and Guilds Institute for Technical Education	xlix
Educational Catalogue (United Kingdom)	1
Hygienic Laboratory	79
Biological Laboratory	80
Complimentary List	81
French Exhibits :	
Introduction	82
Catalogue	92
Belgian Exhibits	116

REGULATIONS.

1. An International Health Exhibition, under the patronage of Her Majesty the Queen and the presidency of His Royal Highness the Prince of Wales, will be held in London in 1884.

Date. 2. The Exhibition will be opened on the 8th of May, and will continue open for a period of about six months.

Objects. 3. The principal objects to be exhibited are comprised in the accompanying classification, which is intended to illustrate chiefly Food, Dress, the Dwelling, the School and the Workshop, as affecting the conditions of healthful life, and also the most recent appliances for Elementary School Teaching and Instruction in Applied Science, Art and Handicrafts.

Rewards. 4. Medals in Gold, Silver and Bronze, and Diplomas of Honour will be awarded on the recommendation of International Juries.

Expenses to be borne by exhibitors. 5. No charge will be made for space, but Exhibitors will have to pay every expense of transit, delivery, fixing and removing their Exhibits, and erection of counters when required, and they must, either personally or by their agents, superintend the despatch, transmission, reception, unpacking, and installation, and at the close of the Exhibition the removal of their goods; in default thereof the Executive Council reserve to themselves the right of doing whatever may be considered necessary, and at the expense of the Exhibitor. Should any goods be deposited in the Exhibition premises during the absence of the Exhibitor or his Agent, the Executive Council will not be responsible for any loss or damage, from whatsoever cause arising.

Applications. 6. Applications for allotment of space must be made on printed forms, which will be supplied on application to the Secretary, International Health Exhibition, South Kensington, S.W., which must be filled up and returned on or before the 1st February, 1884. After this date no application will be received.

Article description. 7. The nature of the articles which it is proposed to exhibit must be fully specified in the Form of Application for space.

Notment. 8. The applications will be laid before the Executive Council, and the Secretary will, as soon as practicable, notify to applicants their decision with regard to the amount of space, if any, allotted to them.

Right to refuse exhibits. 9. The Executive Council reserve to themselves the absolute right of refusing to admit any exhibit.

10. The Foreign and Colonial Commissioners appointed by their Government are invited to communicate with the Secretary. They will be charged with the consideration of all questions relative to the distribution of the space allotted to their respective countries, and the Executive Council will place at their disposal all information and plans that may be useful to them.

11. The applicants for space from countries in which no Commissioner has been appointed will correspond directly with the Secretary.

Railway men. 12. The Executive Council will endeavour to obtain from the various English Railway Companies, special terms for the conveyance of exhibits to and from the

Exhibition, and should they succeed in doing so, such arrangements will be communicated to intending Exhibitors.

Marks on packages.

13. All packages containing goods intended for exhibition must have painted on them the distinctive mark I. H. E., together with the name and address of the Exhibitor. Labels will also be forwarded to each Exhibitor.

Labels.

14. Packages from Foreign Countries must likewise have painted on them the letters I. H. E. They must all be marked in such a way as to show distinctly from whence they come, the name of the country, and of the Exhibitor.

Foreign packages.

15. All cases, counters, platforms, &c., must not exceed the following dimensions, without special permission:—

Show cases and partitions 10 feet above the floor.

Counters 3 " . " "

Platforms 1 foot " "

Railings.

16. Exhibitors may place railings around their stands, subject to approval; but in every instance the railings must be within the area of the "stand," i.e. the space allotted.

Flooring.

17. The flooring must not be altered, removed, or strengthened for the convenience of arrangement, except by sanction of the Executive Council, and at the expense of the Exhibitor.

Obstructions.

18. No Exhibitor will be permitted to display exhibits in such a manner as to obstruct the light or impede the view along the open spaces, or to occasion inconvenience, injury, or otherwise disadvantageously affect the display of other Exhibitors.

Decorations.

19. In order to ensure uniformity of decoration and general good effect, no Exhibitor will be allowed to put up any flags, banners, or other kind of decoration without special permission.

Signs.

20. Signs or name-boards must be placed parallel with the main passages, that is, parallel with the frontage of the respective stands. These must be black with gold letters, and must be hung subject to the approval of the Council.

Handbills.

21. All handbills, printed matter, &c., connected with exhibits for gratuitous distribution, must first receive the approval and permission of the Executive Council, which permission may be withdrawn at any time.

Empty cases.

22. Cases must be unpacked as fast as possible, and the empty cases taken away by the Exhibitors or their Agents. The Executive Council decline to accept any responsibility with reference to empty cases, which must be at once removed from the building at the expense of Exhibitors.

Attendance.

23. Exhibitors will be required to provide all necessary attendance and to keep their stands and exhibits properly cleaned and in good order during the whole period of the Exhibition.

Non-transfer.

24. No Exhibitor will be allowed to transfer any allotment, or to allow any other than his own duly-admitted exhibits to be placed thereon, except by permission of the Executive Council.

Name.

25. All goods exhibited must be in the name of the person who signed the application form.

Selling price.

26. Exhibitors are requested to mark the selling price of the articles exhibited, so as to facilitate the judgment of the Jury, as well as for the information of visitors.

Removal. 27. Objects cannot be taken away before the close of the Exhibition without the special permission in writing of the Executive Council. Special arrangements will be made with regard to perishable exhibits.

Refreshments. 28. As refreshments come within the scope and classification of this Exhibition, all methods of preparing the same, whether by cookery or otherwise, and the display and sale thereof, will be matters of separate arrangement with those wishing to be represented in this Section of the Exhibition.

Machinery. 29. Exhibitors of apparatus requiring the use of water, gas or steam are requested to make application to the Secretary for a special form, which has been prepared for this Section of the Exhibition.

Stoves, grates, &c. 30. All stoves, grates, &c., must be arranged with a view to the abatement of smoke.

Dangerous substances. 31. All fulminating and explosive substances, and all dangerous substances, are absolutely forbidden to be sent.

Spirits, &c. 32. Spirits, alcohol, oils, essences, corrosive substances, and generally all substances which might spoil other articles or inconvenience the public, can only be received in solid and suitable vessels of small size.

Catalogue. 33. The Executive Council reserve the sole right of compiling a catalogue of the exhibits under regulations which will be duly notified. Each nation will, however, have the right to produce, at its own expense, a catalogue of all the objects in its own Section.

Testing and analysing. 34. The Executive Council reserve to themselves the right of causing any of the exhibits to be examined, tested or analysed for such use as they may think fit.

Photographing, &c. 35. No article exhibited may be photographed, drawn, copied or reproduced, in any manner whatsoever, without the special sanction of the Exhibitor and of the Executive Council.

Non- liability. 36. The Executive Council will not hold themselves responsible for loss or damage occurring to any exhibit from any cause whatsoever; but while declining any responsibility, it is the intention of the Council to take such precautions as they deem necessary.

Date of reception. 37. No goods can be sent in previous to the 15th March without special permission; after the 15th April no goods will be received.

Right to alter rules. 38. The right to add to, alter, amend or expunge any of these Rules is reserved by the Executive Council.

Sales binding. 39. Both Englishmen and Foreigners in becoming Exhibitors declare by so doing their compliance with the whole of these Regulations, together with such other Regulations as the Executive Council may issue from time to time.

Right of removal. 40. The Executive Council reserve the right to remove the objects belonging to any Exhibitor who may not conform to the Regulations.

Non- liability. 41. If any damage or injury shall be caused or occasioned during the Exhibition by any exhibited machine, implement, or article to any visitor or other person, or to any officer, servant, or others then and there employed by the Executive Council of the International Health Exhibition, 1884, then the Exhibitor to whom such machinery, implement, or article may belong shall indemnify and hold harmless the said Council from and against all actions, suits, expenses and claims on account or in respect of any such damage or injury which may be so caused or occasioned.

CLASSIFICATION.

DIVISION I.—HEALTH.

Group 1.—FOOD.

CLASS 1. SELECTED DISPLAYS OF UNPREPARED ANIMAL AND VEGETABLE SUBSTANCES used as Food in various countries. Stuffed Specimens of Animals, Birds, &c. Models, Drawings, and Illustrations of the same.

„ 2. PREPARED VEGETABLE SUBSTANCES used as Food, including Tinned, Compressed and Preserved Fruits and Vegetables. Bread, Cakes, and Biscuits of all kinds. Tobacco.

„ 3. PREPARED ANIMAL SUBSTANCES used as Food in a preserved form—Tinned, Smoked, Salted, Compressed and Prepared Animal Foods of all kinds; Food produced by Insects, such as Honey, &c.

„ 4. BEVERAGES of all kinds—(a) Alcoholic; (b) Non-alcoholic; (c) Infusions (tea, coffee, cocoa, chocolate, &c.)

„ 5. NEW VARIETIES of Food. Food for Infants, Food for Invalids, New Concentrated Foods of all kinds.

„ 6. COOKERY PRACTICALLY DEMONSTRATED. Economical Cooking, Workmen's and other Kitchens, Cheap Restaurants, Bakeries, Cafés, Foreign Cookery, &c.*

„ 7. THE CHEMISTRY AND PHYSIOLOGY of Food and Drink. The Detection of Adulteration, Materials used as Adulterants, Analyses, Food Constituents and Equivalents, Tables, Diagrams, &c.

„ 8. DISEASES due to unwholesome and improper Food. Drawings and Models of Animal and Vegetable Parasites, &c.

„ 9. PRACTICAL DIETETICS. Army and Navy Rations, Prison and Workhouse Diet, Foreign Dietaries, &c.

„ 10. PUBLICATIONS AND LITERATURE, MODELS AND DIAGRAMS relating to Group 1.

„ 11. APPARATUS AND PROCESSES for Conserving, Storing, Conveying and Distributing Fresh Food of all kinds.

„ 12. MACHINERY AND APPLIANCES for the preparation of Articles under Group 1.

* *Special Notice.*—As Refreshments come within the scope of this Exhibition, all methods of preparing the same, whether by cookery or otherwise, and the display and sale thereof, will be matters of separate arrangement with those wishing to be represented in *this section of the Exhibition*.

Group 2.—DRESS.

CLASS 13. COLLECTIONS illustrative of the History of Dress, National Costume, &c.
 " 14. WATERPROOF CLOTHING, India Rubber, Gutta Percha, &c.
 " 15. FURS, SKINS AND FEATHERS. Dresses for Extreme Climates, &c.
 " 16. DRESS FOR SPORT, HUNTING SUITS, &c.
 " 17. LIFE SAVING DRESS. Divers' Dress. Fireproof Dress.
 " 17A. THE COMPARATIVE VALUE of different Dress Materials for Articles of Clothing.
 " 18. PUBLICATIONS AND LITERATURE, Patterns, Statistics, Diagrams, Models relating to Group 2.
 " 19. MACHINERY AND APPLIANCES for the Preparation of Articles under Group 2.

Group 3.—THE DWELLING-HOUSE.

CLASS 20. DWELLINGS, MODELS AND DESIGNS for the same, and Specimens of Buildings erected in the grounds. Fittings and Accessories for Dwelling-houses. Completely-fitted Apartments.
 " 21. WATER SUPPLY AND PURIFICATION.—Meters, Filters, Water-Fittings, Cisterns, &c.
 " 22. HOUSE DRAINS, their CONSTRUCTION and VENTILATION.—Sewer disconnection; Sinks, Traps, Gullies; the Disposal and Utilization of House Refuse.
 " 23. WATER and EARTH CLOSETS, Ash Closets, Commodes, Urinals, Disinfecting Powders and Fluids, Insect Destroyers.
 " 24. GRATES, STOVES, KITCHENERS, RANGES, BOILERS, &c., for Domestic Use. Apparatus for Heating and Warming, Smoke Abatement, &c.
 " 25. VENTILATORS, Air Inlets and Outlets, Cubic Space of Rooms, Cowls, Air Straining and Cleansing.
 " 26. LIGHTING APPARATUS.—(a) Electrical Apparatus for Illumination and Domestic Use, Secondary Batteries, Electrolriers, Accumulators, &c.; (b) Apparatus for lighting by Gas, Gas Producers, Gas Meters, Gas Fittings, Chandeliers, &c.; (c) Oil and other lamps; Mineral Oil, Wax and other Candles, Vegetable and Animal Oils.
 " 27. FIRE PREVENTION APPARATUS—Extincteurs, Portable Engines, Domestic Fire Escapes, &c.
 " 28. MATERIALS for Sanitary House Construction—Roofs, Walls, Damp Courses, Solid Floors, Damp-Proof Wall-Coverings, Cements, &c.
 " 29. MATERIALS for Sanitary House Decoration, Non-poisonous Paints and Wall Papers, Floor Coverings, Washable Decoration, &c.
 " 30. OBJECTS for INTERNAL DECORATION and use in the Dwelling. Fittings and Furniture.
 " 31. BATHS, Bathing Requisites, Public and Private Wash-houses, Washing Apparatus, Detergents, Appliances for Personal Cleanliness, &c.
 " 32. PUBLICATIONS AND LITERATURE, MODELS, PICTURES, DIAGRAMS, &c., relating to Group 3.
 " 33. MACHINERY AND APPLIANCES relating to Group 3.

Group 3a.—AMBULANCE.

CLASS 31a. AID TO SICK AND WOUNDED IN WAR. TRANSPORT. (a) *By Human Agency*; Stretchers, Litters, Dhoolies, Palanquins, Handcarts, Stretchers on Wheels, (b) *By Animal Traction*; Mule Litters and Chairs, Camel and Elephant Litters, Wheel Carriages. (c) *By Mechanical Means*; Railway Ambulances, Ship or Water Carriage. TREATMENT (with portable appliances and portable drugs). (a) On the Field. (b) In Hut Hospitals. (c) In Tent Hospitals. NAVAL AND MILITARY HYGIENE.

“ 31b. AID TO SICK AND INJURED IN PEACE. TRANSPORT. (a) *By Human Agency*; Stretchers, Litters, Dhoolies, Palanquins, Hand-Carts. (b) *By Animal Traction*; for Accidents and Injuries, for Infectious Diseases, for Ordinary Sickness. (c) *By Mechanical Means*; Railway Carriages for Sick and Invalids, Water Carriage. TREATMENT (with appliances). (a) Hut Hospitals for Infectious Fevers and for Epidemic Diseases. (b) Tent Hospitals. (c) Hospital Ships. (d) Furniture and Fittings for Sick Rooms.

Group 4.—THE SCHOOL.

CLASS 34. DESIGNS and MODELS of Improved Buildings for Elementary Schools, Infant Schools and Crèches.

“ 35. APPARATUS and FITTINGS for Warming, Ventilating, and Lighting Schools, School Latrines, Closets, &c.

“ 36. SPECIAL SCHOOL FITTINGS for Storing and Drying Clothing.

“ 37. SCHOOL KITCHENS and arrangements for School Canteens. Methods of warming Children's Meals, &c.

“ 38. PRECAUTION in Schools for preventing the spread of Infectious Diseases, School Sanatoria, Infirmarys, &c.

“ 39. SPECIAL APPARATUS for Physical Training in Schools, Gymnasias, Apparatus for Exercise, Drill, &c.

“ 40. LITERATURE, Statistics, Diagrams, &c., relating to Group 4.

Group 5.—THE WORKSHOP.

CLASS 41. DESIGNS and MODELS for Improvements in the Arrangements and Construction of Workshops, especially those in which dangerous or unwholesome processes are conducted.

“ 42. APPARATUS and FITTINGS for preventing or minimising the danger to health or life, from carrying on certain trades. Guards, Screens, Fans, Air-jets, Preservative Solutions, Washes, &c.

“ 43. OBJECTS for PERSONAL USE. Mouth-pieces, Spectacles, Dresses, Hoods, &c., for use in certain unhealthy and poisonous trades.

“ 44. ILLUSTRATIONS of DISEASES AND DEFORMITIES caused by unwholesome Trades and Professions. Methods of combating these diseases. Preservative measures, &c.

“ 45. SANITARY CONSTRUCTION AND INSPECTION OF WORKSHOPS, FACTORIES AND MINES. (a) New Inventions or improvements for ameliorating the condition of life of those engaged in unhealthy occupations. (b) Means of economising Human Labour in various Industrial operations.

“ 46. LITERATURE, Statistics, Diagrams, &c., relating to Group 5.

Group 5a.—METEOROLOGY IN ITS RELATION TO THE STUDY OF PUBLIC HEALTH.

CLASS 46A. METEOROLOGICAL INSTRUMENTS, such as are used in climatological investigations ; barometers, aneroids, thermometers, earth thermometers, thermometer stands, hygrometers, anemometers, airmeters, rain gauges, automatic meteorological apparatus, sunshine recorders, evaporation gauges, ozone papers, ozonometers, &c.

“ 46B **DIAGRAMS, MODELS, AND APPARATUS** illustrative of (a) the climatal conditions prevailing in various parts of the world ; (b) the relations between health and disease ; (c) rainfall, percolation, evaporation, and flow from ground, and (d) other subjects embraced by the Exhibition.

DIVISION II.—EDUCATION.

Group 6.—EDUCATIONAL WORKS AND APPLIANCES.

CLASS 47. CRÈCHES and INFANT SCHOOLS.—(a) Apparatus and Fittings for Crèches and Infant Schools ; (b) Games, Toys and Kindergarten Amusements ; (c) Models and Appliances for teaching ; (d) Examples of School Work.

“ 48. **PRIMARY SCHOOLS.**—(a) Apparatus and Fittings ; (b) Models and Appliances for teaching ; Text-books, Diagrams and Examples ; (c) Specimens of Work in Elementary Schools.

“ 49. **DOMESTIC ECONOMY AND OTHER FORMS OF TECHNICAL AND INDUSTRIAL EDUCATION FOR GIRLS.**—(a) Models and Apparatus for the teaching of Cookery, Housework, Washing and Ironing, Needlework, and Embroidery, Dressmaking, Artificial Flower-making, Painting on Silk, Pottery, &c. ; (b) Specimens of School Work.

“ 50. **HANDICRAFT TEACHING IN SCHOOLS FOR BOYS.**—(a) Apparatus and Fittings for Elementary Trade Teaching in Schools ; (b) Specimens of School Work.

“ 51. **SCIENCE TEACHING.**—(a) Apparatus and Models for Elementary Science Instruction in Schools ; Apparatus for Chemistry, Physics, Mechanics, &c. ; (b) Diagrams, Copies, Text-books, &c. ; (c) Specimens of the School Work in these subjects.

“ 52. **ART TEACHING.**—(a) Apparatus, Models, and Fittings for Elementary Art Instruction in Schools ; (b) Diagrams, Copies, Text-books, &c. ; (c) Specimens of Art Work, Modelling, &c., in Schools.

“ 53. **TECHNICAL AND APPRENTICESHIP SCHOOLS.**—(a) Apparatus and Examples used in Primary and Secondary Schools for teaching Handicrafts ; (b) Models, Plans, and Designs for the Fitting up of Workshop and Industrial Schools ; (c) Results of Industrial work done in such Schools.

CLASS 54. SCHOOLS FOR THE BLIND AND FOR THE DEAF AND DUMB.—(a) Apparatus and Examples for Teaching; (b) Specimens of School Work.

„ 55. LITERATURE, Statistics and Diagrams relating to Group 6 and to the Effects of "Cramming" and Overwork on the Young, &c.

„ 56. COLLECTIVE DISPLAYS of School Work and Appliances. SCHOOL MUSEUMS.

„ 57. MACHINERY AND APPLIANCES relating to Group 6.

**TABLE SHOWING WITH WHICH CLASSES THE VARIOUS
SUB-COMMITTEES DEAL.**

CLASSES	1—12	•	FOOD.
„	13—19	•	DRESS.
„	20	CONSTRUCTION AND FITTINGS.
„	21—23	•	WATER SUPPLY AND SANITATION.
„	24—26	•	HEATING, LIGHTING AND VENTILATING.
„	27	WATER SUPPLY AND SANITATION.
„	28—31	•	CONSTRUCTION AND FITTINGS.
„	32, 33	•	WATER SUPPLY AND SANITATION—CONSTRUCTION AND FITTINGS—HEATING, LIGHTING AND VENTILATING.
„	31A, 31B	•	AMBULANCE.
„	34—40	•	SCHOOL AND EDUCATION.
„	41—46	•	WORKSHOP.
„	46A, 46B	•	METEOROLOGICAL.
„	47—57	•	SCHOOL AND EDUCATION.

Patron.

HER MOST GRACIOUS MAJESTY THE QUEEN.

President.

HIS ROYAL HIGHNESS THE PRINCE OF WALES, K.G.

Vice-Presidents.

H.R.H. the DUKE OF EDINBURGH, K.G.
H.R.H. the DUKE OF CONNAUGHT, K.G.
H.R.H. the DUKE OF CAMBRIDGE, K.G.
H.S.H. the DUKE OF TECK, G.C.B.
H.S.H. COUNT GLEICHEN.
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MEMORANDA FOR THE GUIDANCE OF EXHIBITORS,

DRAWN UP BY THE SUB-COMMITTEES AND APPROVED BY THE
EXECUTIVE COUNCIL.

SCHOOL AND EDUCATION.

THE classification of these two groups—4, the SCHOOL; and 6, EDUCATIONAL WORKS and APPLIANCES—is given on pages xii, xiii.

It will be seen that in Group 4 are comprised all the exhibits relating to school construction, to the improvement of the sanitary condition of school buildings, and to means for promoting the health of the scholars by physical exercises and otherwise.

The classification sufficiently shows the character of the exhibits the Committee would wish to see provided. They would, however, lay special stress on those included in Class 39, and relating to physical education. They would be glad to see included as many models as may be convenient of typical elementary schools, and they would appeal for this purpose to School authorities and Managers in this and other countries, and to architects who have given special attention to school construction, for the loan of such models, as well as of plans and diagrams. The admission of the latter, however, must be to a certain extent limited by considerations of space.

As regards Class 40 of this Group—and the same remark will apply to Class 55 in Group 6—the Committee are anxious that this class should be limited, with a view to preventing the Exhibition being overburdened with literature. Books stowed away in glazed cases, the backs only being visible, as is the usual custom in exhibitions, are of little practical value or interest; and if available for examination a constant watch is necessary.

Group 6—which forms the second division of the Exhibition within the province of this Committee—relates entirely to educational works and appliances, these being restricted to such, in the first instance, as attach to primary schools, and secondly, to scientific, artistic, and technical education in secondary and higher grade schools, it being understood that Class 49 comprises what may be considered as technical education for women. Regarding this Group it will be noted that in every Class where they can come in, examples or specimens of school work are included. In the case of primary and infant schools the Committee would be glad to see this part of the Exhibition strictly limited to what is important or characteristic, and the same remark to a great extent applies to Class 49.

The Committee would wish to arrange for as large a display of maps and diagrams as the wall space available will permit.

Of the specimens of work of a handicraft or technical character, the Committee would be glad to see as full a collection as possible, especially of the higher class of work done in certain foreign schools.

The Committee do not consider it at all necessary that extensive collections of apparatus and fittings for infant and elementary schools in use in this country should be shown, especially when it is remembered that the educational collection of the South Kensington Museum is in the close neighbourhood of the Exhibition.

Among other points, on the importance of which the Committee would lay stress, may be mentioned the artistic decoration of schoolrooms, the exhibition of works of art suitable for use in schools, and the exhibition of objects suitable for school museums, or possibly of a typical school museum.

As regards the instruction of the blind and of the deaf and dumb—as in all other departments—the Committee would like the various systems to be fully represented, and it should be understood that no preference would be given to one system above another on account of any individual views which members of the Committee might entertain.

It will be noticed that in Class 55 are included the effects of cramming and overwork on the young. The Committee understand that this subject is mentioned in the classification merely in order that it might be included amongst the subjects for Conferences, and they do not understand that any exhibits intended to illustrate it will be sought for.

As regards collective displays (Class 56), the Committee will endeavour to organise displays of this character, which are likely to have a higher educational value than the exhibition of separate articles.

INTERNATIONAL CONFERENCE ON EDUCATION.

An International Conference on Educational matters will be held during the week commencing August 4.

SUBJECTS FOR DISCUSSION :

1. *Conditions of Healthy Education.*—Under this head may be included—the consideration of the structure, fitting, and equipments of a School; gymnastics, and other physical exercises; the right apportionment of time to different subjects of instruction in schools of various classes; the indirect effect of pictorial or other decoration in improving the taste and cultivating the imagination, and in increasing the scholars' interest in their work.

2. *Infant Training and Teaching.*—a. Kindergarten; b. Instruction generally. Under this head may be included—the right structure of schools and class rooms for very young children; the apparatus needed for play and for instruction; the exercises, mental or manual, best fitted to awaken the faculties; the distribution of time; pictures, decoration, collections of objects, &c.

3. *Technical Teaching.*—a. Science; b. Art; c. Handicrafts; d. Agriculture; e. Domestic Economy. Under this head may be included: (a) methods of teaching the different branches of physical and of natural science, the equipment of school laboratories, the value of experimental work by pupils, the organisation of evening science classes and of science schools, the connection between the teaching of pure and applied science; (b) the teaching of drawing and of colouring as a preparation for designing and decorative work; (c) the value of special and general workshop instruction in elementary, higher, and evening schools, the equipment of school workshops; (d) the teaching of agricultural science in elementary, in intermediate, and higher schools, in evening science classes, in special colleges, and in the *universities*, methods of teaching, experimental farms; (e) methods of

teaching cookery in schools, *e.g.*, by book-lessons, by demonstrative lectures, and in school kitchens.

4. Teaching of Music in Schools.

5. Museums, Libraries, and other Subsidiary Aids to Instruction in connection with Schools.—Under this head may be included the means of establishing and managing school libraries; the promotion, with the help of the scholars or otherwise, of museums of art and science, illustrative of the local fauna, flora, industry, history, archaeology, &c., &c.; school savings' banks; botanical and other field excursions; visits to picture galleries and museums; voluntary evening classes for singing, recitations, &c.; and generally the means of connecting the influence of the school with home life, and self-improvement.

6. Training of Teachers.—Under this head will be considered the right professional preparation for teachers in—*a.* elementary, *b.* intermediate and higher, *c.* special and technical schools. The relative advantages of training in special institutions and in colleges for general education. Normal colleges: their constitution, conditions of admission, programme of studies. Apprenticeship. Model and practising schools. Universities and their relations to the training of teachers. Professorships and lectureships on education. Examination for diplomas and certificates. Legal recognition of such diplomas and certificates. Registration of teachers.

7. Inspection and Examination of Schools.—*a.* By the State. *b.* By the universities
c. By other public bodies.

8. Organisation of Elementary Education.

9. Organisation of Intermediate and Higher Education.

10. Organisation of University Education.

11. Systems of Public Instruction in various Countries.

A complete programme, which will be drawn up by the Sub-Committee appointed (a list of which will be found on page xxiii), will be published in due course.

LIBRARY AND READING ROOM.

The Executive Council have assigned a large room, in the Royal Albert Hall, to be used as a Library and Reading Room in connection with this Exhibition. Authors, Publishers and others have been invited to send copies of works on subjects embraced in either or both of the two Divisions of the Exhibition—HEALTH and EDUCATION.

The Books received will be classified and catalogued, and made available for the use, in the Library and Reading Room, of the public visiting the Exhibition. A Catalogue will be printed. All Packages containing Books for the Reading Room and Library should be forwarded, carriage paid, to the Secretary of the Library Committee, Royal Albert Hall, W. The Executive Council cannot hold themselves responsible for any loss or damage to Books sent in by Exhibitors, but a reference to the Regulations will show that every precaution has been taken.

LABORATORY.

MODEL LABORATORIES OF PUBLIC HEALTH for the display and demonstration of Methods of Examining Food, Air, Water, Soil, and Constructive Materials of Dwellings, *Disinfectants, etc.*, will be formed. These Laboratories would afford an instructive model for municipalities and sanitary authorities.

LABORATORY FOR BIOLOGICAL RESEARCH,

Under the charge of Mr. WATSON CHEYNE and an Assistant.

The Laboratory will be divided into a large room—the Laboratory proper—and three small ones, two for incubators, etc., and one for cleansing purposes.

The exhibit will include all the instruments, materials, and methods (short of the actual inoculation of animals) employed in the investigation of the bacteria and fungi associated with the zymotic diseases of man, animals, and plants. The methods of testing the power of disinfectants will, within the same limits, be also shown.

In more detail there will be exhibited: the materials and processes employed in preparing sterilised cultivating media—cultivations of various micro-organisms, especially those associated with disease—modes of demonstrating bacteria by staining, etc.—modes of investigating bacteria in air, water, and soil, and of isolating and studying the organisms found—methods for testing the power of chemical agents in destroying bacteria, with illustrations—photographs of the various micro-organisms—micro-photographic apparatus microtomes, microscopes, incubators, purifying chambers, etc.

Demonstrations will be given from time to time, at which several of the matters mentioned above will be illustrated, such as the forms of various micro-organisms—cultivations of some organisms to show their modes of growth—methods of preparing sterilised cultivating materials, and of carrying out a series of pure cultivations—methods of examining air, earth, and water for bacteria.

HYGIENIC LABORATORY,

Under the charge of Professor CORFIELD.

Assisted by Mr. CHARLES E. CASSAL and Dr. W. FRASER.

In this will be exhibited all the apparatus necessary for the Physical, Chemical, and Microscopical examination of Water, Air, Soils, Foods, Disinfectants, etc., and also for the examination of Sanitary Appliances.

Illustrations of the following will be given:—

Microscopical examination of water sediments; chemical examination of mineral and of organic matters in suspension and solution in water; growth of organisms in gelatine and sugar solutions; testing the value of filters.

Methods for estimation of the carbonic acid in air; including the "household test;" detection of other gaseous impurities; chemical and microscopical examination of the organic matter in air.

Mechanical, chemical, and microscopical examination of soils.

Chemical and microscopical examination of various articles of food and drink; detection of adulteration.

Examination of "disinfectants," wall papers, articles of clothing, etc.

Apparatus for experiments illustrating the movements of air in pipes, etc., and its passage through various materials; methods for testing the soundness of drain pipes and soil pipes; the efficiency of traps and other apparatus; and any other experiments connected with Hygiene.

Physical, Chemical, and Microscopical Demonstrations will be given from time to time.

JURY COMMISSION.

H.R.H. the PRINCE OF WALES, as President of the International Health Exhibition, has delegated to a Commission, selected from among the members of the Executive Council the duty of making arrangements for the effective carrying out of the work of the International Juries.

This Commission consists of:—Lord Reay (Chairman); Sir James Paget, Bart., F.R.S.; Sir Frederick Abel, C.B., F.R.S., D.C.L.; Sir Philip Cunliffe-Owen, K.C.M.G., C.B., C.I.E., Dr. George Buchanan, F.R.S.; with Mr. H. Trueman Wood (Secretary of the Society of Arts); and Mr. Gilbert R. Redgrave, Assoc. Inst. C.E., Joint Secretaries.

His Royal Highness has expressed his wish that the Exhibitors should themselves aid in the selection of Jurors, and in order to carry this suggestion into effect, the Exhibitors will each of them be requested to enter, on a form provided for the purpose, the names of three gentlemen to be recommended as Jurors.

From the list thus formed the Commission will make a selection. They will endeavour to give full weight to the opinions expressed by Exhibitors: but it must be understood that they will not feel themselves restricted to the list of names suggested, especially as the gentlemen recommended by a majority of the Exhibitors may, in some cases, be unwilling or unable to serve.

PRIZES OFFERED BY THE SOCIETY OF ARTS.

The Council of the Society of Arts announce that they are prepared to award the following prizes in connection with the International Health Exhibition:—

Under the John Stock Trust, a Society's Gold Medal or £20, for the best example of sanitary architectural construction, Classes 20, 28, 29, 30, 32.

Under the Shaw Trust, a Society's Gold Medal or £20, for the most deserving exhibit in Classes 41, 42, 43, and 45 (relating to Industrial Hygiene).

Under the North London Exhibition Trust, a Society's Gold Medal or £20, for the best set of specimens illustrating the handicraft teaching in any school—Classes 49 and 50.

Under the Fothergill Trust, Two Gold Medals (or two sums of £20), one for the best exhibit in Class 27 (Fire Prevention Apparatus), and one for the best exhibit in Class 26 (Lighting Apparatus).

From the Trevelyan Prize Fund, Five Gold Medals (or five sums of £20), for the best exhibit in each of the following Classes—2, 3, 6, 7, and 11 (all comprised within Group 1, "Food").

The "Siemens' Prize," a Society's Gold Medal or £20, for the best application of Gas to Heating and Cooking in Dwellings.

Each prize will be a Gold Medal, or the sum of £20, at the option of the recipient.

The Council propose to ask the juries in each class to recommend for their consideration either two or three exhibits which they might consider deserving a prize. It will be assumed that all the exhibits in the classes specified, which come under the above definitions, are eligible for the awards. It will not be necessary for any special application to be made in respect of these Prizes.

LIST OF SHILLING HANDBOOKS

WHICH WILL BE ON SALE THROUGHOUT THE TERM OF THE EXHIBITION AT THE OFFICIAL BOOKSTALLS.

SUBJECT.	AUTHORS.
Healthy Villages. <i>Illustrated</i>	H. W. DYKE-ACLAND, C.B., M.D., F.R.S.
Healthy Bed-Rooms and Nurseries, including the Lying-in-Room	Mrs. GLADSTONE.
Healthy and Unhealthy Houses in Town and Country. <i>Illustrated</i>	WILLIAM EASSIE, C.E. Appendix by ROGERS FIELD, C.E.
Healthy Furniture and Decoration. <i>Illustrated</i>	ROBERT W. EDIS, F.S.A.
Healthy Schools	CHARLES PAGET, M.R.C.S.
Health in Workshops. <i>Illustrated</i>	JAMES B. LAKEMAN.
Manual of Heating, Lighting and Ventilation. <i>Illustrated</i>	Captain DOUGLAS GALTON, C.B., F.R.S.
Diet, in relation to Health and Work	A. WYNTER BLYTH, F.C.S.
Principles of Cookery	SEPTIMUS BERDMORE.
Food and Cookery for Infants and Invalids	Miss WOOD. Preface by R. B. CHEADLE, M.D., F.R.C.P.
Alcoholic Drinks	J. L. W. THUDICHUM, M.D., F.R.C.P.
Water and Water Supplies	Professor ATTFIELD, Ph.D., F.R.S.
English and Exotic Fruits. <i>Illustrated</i>	W. T. THISELTON DYER, M.A., C.M.G.
Salt and other Condiments	JOHN J. MANLEY, M.A.
Legal Obligations in respect to Dwellings of the Poor	HARRY DUFF, M.A., Barrister-at-Law. Preface by ARTHUR COHEN, Q.C., M.P.
“Our Duty,” or Moral Responsibility of the Individual in regard to Health	G. V. POORE, M.D., F.R.C.P.
Public Health Laboratory Work. <i>Illustrated</i>	W. WATSON CHEYNE, F.R.C.S. ; W. H. CORNFIELD, M.A., M.D., F.R.C.P., and CHARLES E. CASSAL, F.I.C., F.C.S.
Physiology of Digestion and the Digestive Organs. <i>Illustrated</i>	Professor ARTHUR GAMGEE, F.R.S.
Fermentation	(Dr. DUCLAUX. Preface by M. LOUIS PASTEUR, Membre de L’Institut. SHIRLEY F. MURPHY.
Infectious Disease and its Prevention	
Cleansing Streets and Ways in the Metropolis and Large Cities. <i>Illustrated</i>	WILLIAM BOOTH SCOTT, M. Inst. C.E.
London Water Supply	Colonel Sir FRANCIS BOLTON, C.E.
Fires and Fire Brigades. <i>Illustrated</i>	Captain EYRE M. SHAW, C.B.
Athletica. Part I. <i>Illustrated</i>	Rev. E. WARRE, M.A.
Athletica. Part II.	(Hon. E. LYTTELTON, M.A. ; and GERARD F. COBB, M.A.)
Dress in relation to Health and Climate. <i>Illustrated</i>	E. W. GODWIN, F.S.A.
Accidental Injuries: their Prevention and First Management. <i>Illustrated</i>	JAMES CANTLIE, F.R.C.S.
The Ambulance. <i>Illustrated</i>	Surgeon-Major EVATT, M.D., A.M.D.
Schools of Art, their origin, history, work, and influences	JOHN SPARKEs.

INTRODUCTION TO THE GENERAL CATALOGUE OF EDUCATIONAL EXHIBITS.

THE present collection of objects does not profess to illustrate so vast and comprehensive a subject as that of education in all its fulness and variety. But the primary purpose of the whole Exhibition being to elucidate the conditions of health, it was considered expedient to attach to the principal display, such objects and educational appliances as had a special relation to healthful school life. Accordingly, while it will be found that many important departments of the whole field of public and private instruction lie necessarily outside the scope of the present Exhibition, special pains have been taken to gather together an interesting and characteristic display of the latest devices for:—

- (1.) The improved building, fitting, and sanitary arrangements of schools.
- (2.) Apparatus for gymnastic and physical training.
- (3.) The Kindergarten and other means of infant discipline, training and instruction.
- (4.) Art teaching, the adornment of schools, and the means of cultivating taste.
- (5.) Handicraft and industrial education.

Two foreign Governments—those of France and Belgium—have organised elaborate collective Exhibitions, showing the methods and results both of primary and secondary instruction in those countries, and many objects are also exhibited illustrating the newest appliances for instruction in use in Germany, in the United States of America, in Sweden, and in Switzerland. That there is no display on the part of the English Government may be readily accounted for by the fact that the Education Department in this country occupies a position wholly unique, and differing substantially from that filled by the Bureau of Public Instruction in almost every Continental country. The State in England administers a large public fund for national primary education, and in doing so necessarily exercises considerable control over the character and aims of elementary schools. But this control is indirect rather than authoritative. The Government does not establish schools, nor appoint or pay teachers, nor prescribe systems, books, or methods of instruction. In all these matters the initiative is taken by local bodies, either voluntary, or representing various religious communities; or elected by the ratepayers, in the cases in which schools are provided by Boards. It is the function of the Education Department to require that by some means efficient schools are provided, and to distribute out of the funds provided by Parliament, grants in aid of local efforts. The amount of these grants depends on the number in the schools, and on the efficiency of the instruction as tested by annual inspection and examination. The code, issued from time to time under the authority of the Education Department, indicates the conditions on which payments are made. The only

obligatory subjects of instruction are reading, writing and arithmetic, and, for girls, sewing. All other subjects are optional, and the educational character of the school is left to be determined by the several managers, on a due consideration of the local circumstances and needs.

Since the English Education Department scrupulously abstains from enforcing particular methods and processes and confines itself to the estimation of results, it has no books, apparatus or system of instruction to exhibit. There are indeed, as the Report of the Department for the year 1883, shows 4,273,304 children on the Registrars in aided schools in England and Wales, or about 1 in 6 of the entire population; but for the illustration of the buildings in which these children are taught, and the appliances used in teaching them, recourse must be had to the great voluntary societies, or to the municipal bodies which have founded and furnished the schools, and not to the Central Government.

Foremost among the voluntary societies are the National Society for Promoting the Education of the Poor in the Principles of the Established Church, which was founded in 1811, and the British and Foreign School Society established in 1808. During the years which preceded the enactment of the Elementary Education Act in 1870, nearly all the provision for public instruction was made by these two Societies, and they still exercise large influence, both in the maintenance of schools and in the preparation of teachers in training colleges. Besides these the Wesleyan Education Committee and the Catholic Poor School Committee supervise the schools of their respective denominations. There are also societies which have devoted themselves largely to the publication of educational literature. Among these the most important are the venerable Society for Promoting Christian Knowledge, the Religious Tract Society, the Sunday School Union, and the Church of England Sunday School Institute.

Each of these influential voluntary associations has sent to the Exhibition a collection of its school apparatus, plans and publications, and has in the present catalogue taken the opportunity to place on record an account of its aims and history, and of the scope and character of its present work. Of the great municipal bodies which have been called into existence by the Act of 1870 for the special purpose of controlling elementary education in their respective towns, the School Boards of London, Birmingham, Sheffield, Edinburgh and Glasgow are most conspicuous for the completeness with which they have sought to exhibit the latest improvements in the fitting and general equipment of Board Schools. The Christian Brothers, a society of devoted Catholic teachers, who in France, Belgium, the United States, and in our own country, have organized and conducted many schools for the poor, also send a very interesting collective display, showing the methods and results of their work.

The increased attention now being devoted to the whole subject of infant training, the enlarged sympathy and interest with which the best modern teachers are studying the methods of Fröbel, and the recognition by the Education Department, for the first time in Mr Mundella's Code, of the need of training, object lessons, recreation, and varied employments, as results to be kept in view, as well as formal instruction, in awarding the Infant School Grant, have justified the appropriation of a considerable space to the Kindergarten and to the exhibition of pictures, games, manual exercises, and apparatus.

specially adapted for the training of very young children, whether in schools or nurseries. The authorities of the British and Foreign School Society, which in its Training Colleges at Stockwell and Saffron Walden is directing considerable attention to the instruction of young teachers in the methods and principles of the Kindergarten, have devoted special pains to the collection and arrangement of suitable objects with a view to make this part of the Exhibition complete.

Most of the leading firms engaged in the production of school-desks and fittings, or in the publication of maps, diagrams, school-pictures and text-books, have sent examples of their educational appliances; and some illustrations of the modes of teaching domestic economy to girls, and the elements of skilled handicrafts to boys, are included in the collection. From Belgium, Holland, and Germany special illustrations will be found of the mode of instructing scholars in Apprentice and Trade Schools. Two or three members of the Royal Commission on Technical Instruction, who have given their services as members of the Educational Committee of advice and selection, have taken special interest in securing good examples, showing the best methods of scientific and industrial instruction now in use. The Engineering Department of University College sends illustrative exhibits, showing how various departments of Applied Science and Technology are treated in that institution. The School of Art Wood-Carving in connection with the City and Guilds of London Institute also contributes specimens of its methods and its results.

In other special Departments, notably the means of cultivating Art in schools, the mode of instructing deaf mutes by the lip or oral system; and the various devices adopted in the teaching of the Blind, the Exhibition, though not exhaustive, contains a number of objects showing the most recent improvements. The Society for training Teachers of the Deaf on the German system of Heinicke; the Association for the Oral Instruction of the Deaf and Dumb, under the direction of Mr. Van Praagh; the Yorkshire Institution for the Deaf and Dumb; the older Deaf and Dumb Asylum; and the Jews' Deaf and Dumb Home; also the Schools for the blind at York, the Royal Normal College at Norwood, the Amsterdam Institution for the Blind, and the National Institution for Blind Children in Paris will be found among the Exhibitors.

In addition to the collection of such instruments of education as maps, desks, apparatus, and various forms of visible illustration, the Exhibition contains an apartment in which the latest educational literature, especially school books, manuals, books for the use of the teacher, and works on the Art, Sciences, and History of Education, have been brought together for purposes of reference.

THE CITY AND GUILDS OF LONDON INSTITUTE FOR THE ADVANCEMENT OF TECHNICAL EDUCATION.

It is now some years ago since certain of the Livery Companies of London, recognising the altered conditions of apprenticeship, were moved by the desire to devote a part of the funds which had been bequeathed to them, and which had accumulated in their hands, to the general improvement, by means of technical education, of the industries of the country, or of the special trades with which they severally were associated. To the action of the Clothworkers' Company, the establishment of Weaving and Dyeing Schools in Yorkshire is mainly due, whilst the Goldsmiths' and Plasterers' Companies have offered valuable prizes from year to year for designs in connection with the industries with which they are concerned. The Drapers', the 'Fishmongers', the Cutlers', the Shipwrights', the Carpenters', the Plumbers', the Turners', the Coachmakers', the 'Paper-stainers', and other Companies have, by means of occasional lectures, by prizes, by exhibitions, and by other agencies, endeavoured to promote the interests of their several trades. It was, however, generally felt that these isolated efforts of individual Companies, although productive of some good results, were not calculated to exert that beneficial influence on the education of the industrial classes of the country which might follow from their united action; and, accordingly, some time before the question of technical education was as prominently before the public as it now is, a suggestion was thrown out that the Livery Companies of London might do well to combine for the purpose of developing a general scheme of technical instruction, adapted to the requirements of all classes of persons engaged in productive industry. This idea took practical shape in the year 1877, when, at a meeting of the representatives of several of the principal Companies, a Committee was formed for the purpose of preparing a scheme for a national system of Technical Education. The Committee so constituted placed themselves at once in communication with a number of gentlemen distinguished for their scientific ability, as well as for their knowledge of the educational wants and requirements of the industrial classes of this country, and obtained from them a set of valuable reports on the best means of giving effect to their object, and the Committee, having carefully considered the various suggestions which had been made to them, prepared the outlines of a scheme which they submitted to the representatives of the several Livery Companies who had joined the Association. This scheme provided for the foundation in London of a Central Institution for higher Technical Instruction; for the establishment of, or for assistance to, trade schools, for the conduct of examinations in technology, and for the subsidising of other institutions in London or in the provinces having cognate objects.

The most important feature in this scheme was undoubtedly the establishment of a Central Institution which should serve as a training school for teachers, and which should afford technical instruction of a high character.

adapted to the requirements of those preparing to take the management of industrial works.

As early as the year 1876, the Clothworkers' Company had made a grant to the Society of Arts towards the payment of Teachers of Classes in Technology, and in the year 1878, these Technological Examinations were transferred to the Association of Livery Companies, then provisionally constituted as the City and Guilds of London Institute for the Advancement of Technical Education. During the year 1879, negotiations proceeded between the Committee of the Institute and Her Majesty's Commissioners of the Exhibition of 1851, and resulted in the acquisition by the Institute from the Commissioners, at a nominal rental, of the ground in Exhibition Road on which the Central Institution now stands. But the development of other parts of the scheme, to which some of the subscribing companies attached even greater importance was not suffered to remain in abeyance during the erection and equipment of the Central Institution.

In order that a commencement might be made in the provision of technical instruction for artizans and others, the Committee of the Institute, in the autumn of 1879, engaged the services of Mr. W. E. Ayrton and of Mr. H. E. Armstrong, to give courses of lectures and laboratory instruction in Physics and in Chemistry in their application to different industries. These classes, which were the origin of the Finsbury Technical College, were temporarily carried on in the basement of the Cowper Street Schools, belonging to the Middle Class Schools Corporation. It was soon found that they supplied a distinct want, and that for their fuller development a specially adapted building would be required, and the Committee of the Institute were glad to be able to give greater prominence to this part of their original scheme, by the offer of the Drapers' Company to contribute £10,000 towards the erection of a suitable building, provided the Institute would supply at least an equal amount, and would undertake the maintenance of the school. As soon as it appeared evident that the work undertaken by the associated guilds was likely to develop in more than one direction, and to increase in magnitude and in importance, the Committee of the Institute resolved to appoint an Organizing Director, who should, at the same time, act as Secretary to the Council, and in the spring of the year 1880, Mr. Philip Magnus was elected to this post; and shortly after his appointment the Institute was registered under the Companies' Acts as the City and Guilds of London Institute for the Advancement of Technical Education.

The Institute thus established, consisted of a Board of Governors, nominated by the several contributing companies, the Council, and the Executive Committee being elected therefrom. The Chairmanship of the Council was accepted by the Right Hon. the Earl of Selborne, Lord High Chancellor of England, and that of the Executive Committee by Sir Frederick Bramwell, F.R.S., M.Inst.C.E., while Sir Sydney H. Waterlow, Bart., M.P., who, as a member of the Clothworkers' Company, had been associated with every movement for the promotion of Technical Education, was elected Treasurer. The Committee were equally fortunate in securing the services of Mr. John Watney, Mr. W. P. Sawyer, and Mr. Owen Roberts, as Honorary Secretaries to the Council. As public attention was more

and more attracted to the question of Technical Education, and to its influence in improving the industries of the country, the field of work occupied by the Institute gradually widened, and the number of Guilds contributing thereto steadily increased. In December, 1880, the Lord Chancellor addressed a letter to the Masters of the several Guilds in which he expressed the hope that, in view of the need of technical instruction in this country, the Livery Companies would still further assist the Institute in its good work.

"Those," said he, "who have studied the causes of this successful competition on the part of the foreigner, concur in agreeing that prominent among these causes are the opportunities afforded for obtaining an excellent Technical Education in most parts of the Continent of Europe, and the want in our own country of any sufficient training of a similar kind."

The result of this appeal was a considerable increase in the contributions of several of the City Companies. The Drapers' and Goldsmiths' Companies raised their subscriptions from £2,000 to £4,000 a-year, the Clothworkers Company from £2,000 to £3,000, and many other companies did the same in proportion to their means. The total subscriptions to the Institute advanced from £12,840, in 1880, to £23,075 in 1881. The value of the Institute's operations in promoting Technical Education received about this time an important recognition in the acceptance by H.R.H. the Prince of Wales of the Presidency of the Institute. H.R.H. the Prince of Wales has since shown in various ways his interest in the work of the Institute, and his sympathy with the objects which the City and the Livery Companies of London have combined to promote. In July, 1881, he set the foundation column of the Central Institution. In March, 1882, he presided at the annual meeting of the Governors, and very recently, when it was found that further funds were required for the equipment of the Central Institution, he addressed a letter to the Right Hon. the Lord Mayor and to the Masters of the Livery Companies, which has resulted in a sensible augmentation of the funds of the Institute.

A decided impulse was given to the establishment of Technical Schools in this country by the appointment, in the year 1881, of a Royal Commission, to enquire into the instruction of the industrial classes of certain foreign countries in Technical and other subjects, for the purpose of comparison with that of the corresponding classes of this country, and into the influence of such instruction on manufactures and other industries at home and abroad. The Commission consisted of Mr. Bernard Samuelson, M.P., F.R.S., Chairman, Mr. H. E. Roscoe, D.C.L., F.R.S., Mr. Philip Magnus, the Director and Secretary of the Institute, Mr. John Slagg, M.P., Mr. Swire Smith, Mr. William Woodall, M.P., and Mr. G. R. Redgrave, Secretary.

After spending nearly three years in the conduct of their enquiries, in the course of which they visited more than ninety towns on the Continent and in the United Kingdom, the Commissioners were able to report more favourably than was expected of the existing facilities for technical instruction in this country. They found that evening classes were being held in all important manufacturing centres, under the direction of the Science and Art Department and of the City and Guilds of London Institute, and that these two educational bodies were

affording valuable assistance in the establishment and maintenance of schools in which Science and Art were being taught in their application to the local industries. The Commissioners state that "they are able generally to endorse the several schemes of Technical Instruction now in operation or about to be carried on by the City and Guilds of London Institute"; and they pointedly remark, "No organization like that of the Science and Art Department and of the City and Guilds of London Institute exists in any Continental country, and the absence of such organizations has been lamented by many competent persons with whom we came in contact."

TECHNICAL EXAMINATIONS.—Prominent among the agencies adopted by the City and Guilds of London Institute, for promoting Technical Education in the various manufacturing centres of the Kingdom, is their scheme of Technical Examinations. In connection with these examinations a large number of classes have been instituted, in which practical instruction is given in the application of Science and of Art to different industries. The work done by the students in these classes is inspected and examined by the Institute, and on the results of the annual examinations certificates and prizes are granted, which are beginning to be regarded as diplomas of proficiency, and which frequently enable operatives to obtain better employment and higher remuneration. These evening classes have already become, and are likely in future to become still more, the nuclei of Technical Colleges, mainly supported by the towns in which they are situated, but connected with and affiliated to the City and Guilds of London Institute by means of its superintending influence.

In olden times, at the close of his seven years' apprenticeship, and on his giving satisfactory evidence of his proficiency, the master and wardens of the guild admitted the young apprentice to the freedom of the craft; and the award of the full technological certificate of the Institute, which is given to those only who satisfy the examiners of their theoretical and practical knowledge, and in such cases as admit of it, of their skill in workmanship, may be regarded as the modern equivalent of this ancient practice of the guilds.

According to the Programme of Technological Examinations for 1883-84, examinations are held in the following subjects:—

1. Alkali and Allied Branches.	11. Paper manufacture.
A. Salt manufacture.	12. Pottery and Porcelain manufacture.
B. Alkali "	13. Glass manufacture.
C. Soap "	14. Dyeing—
2. Bread-making.	A. Silk.
3. Brewing.	B. Wool.
4. Distilling—	15. Bleaching, Dyeing, and Printing of Calico or Linen.
A. Coal Tar distilling.	16. Tanning Leather.
B. Spirit manufacture.	17. Photography.
5. Sugar manufacture.	18. Electro-Metallurgy.
6. Fuel.	19. Textile Fabrics, manufacture of—
7. Oils, Colours, and Varnishes, manufacture of.	A. Cloth.
8. Oils and Fats, including Candle manufacture.	B. Cotton.
9. Gas manufacture.	C. Linen.
10. Iron and Steel manufacture.	D. Silk.
	E. Jute.

20. Lace manufacture.	27. Tools—
21. Weaving and Pattern-designing.	A. Wood-working.
22. Electrical Engineering—	B. Metal-working.
A. Telegraphy.	28. Mechanical Engineering.
B. Electric Lighting and transmission of power.	29. Carriage-building.
C. Electrical Instrument-making.	30. Printing.
23. Metal Plate Work.	31. Ores, Mechanical Preparation of.
24. Plumbers' Work.	32. Mine Surveying.
25. Silversmiths' "	33. Milling (Flour manufacture).
26. Watch and Clock-making.	34. Carpentry and Joinery.

The increase in the number of candidates for these Examinations since they were brought under the direction of the Institute has been very great, as may be seen from the following table:—

Year.	Number of Centres.	Number of subjects of examination.	Number of Candidates.	Number of Candidates who passed.
1879	23	7	202	151
1880	85	24	816	515
1881	115	28	1,563	895
1882	147	37	1,972	1,222
1883	154	37	2,397	1,498

At the Examination held in May last 3628 candidates presented themselves, showing an increase of 1231 on the previous year. Already in Manchester, Oldham, Nottingham, Bradford, Huddersfield, Glasgow, Leeds, Preston, Belfast and elsewhere, Technical Schools have been established, in which practical instruction is given to artizans and others in subjects included in the Institute's Programme; and recently, through the liberality of Mr. Quintin Hogg, the Polytechnic Institution in Regent Street has been converted into a Technical School, in which about 1700 students receive Scientific and Technical Instructions.

CENTRAL INSTITUTION, EXHIBITION ROAD.—This Institution, a portion of which has been lent by the Executive Committee of the City and Guilds of London Institute to the Council of the International Health Exhibition for the holding therein of an Exhibition of School Appliances, is intended to afford practical, scientific, and artistic instruction, which shall qualify persons to become—

1. Technical teachers.
2. Mechanical, civil and electrical engineers, architects, builders, and decorative artists.
3. Principals, superintendents and managers of chemical and other manufacturing works.

The main purpose of the instruction to be given in this Institution is to point out the application of the different branches of science to various manufacturing industries, and in this respect the teaching will differ from that given

in the Universities and in other institutions, in which science is taught rather for its own sake than with a view to its industrial applications. The instruction to be given in the Central Institution will include chemistry, engineering, mechanics, mathematics, physics, drawing, manufacturing technology, workshop practice, modern languages, and applied art, and Professor W. E. Ayrton, P.R.I.C., Professor H. E. Armstrong, F.R.S., Ph.D., Professor Henrici, F.R.S., and Professor C. W. Unwin, B.Sc., have already been appointed to superintend the principal departments of instruction.

The plans for this Institution were prepared by Mr. Alfred Waterhouse, A.R.A., under whose direction the building has been erected. The foundation column was set by H.R.H. the Prince of Wales on July 18th, 1881. In the reply of His Royal Highness to the address presented to him on the occasion by the Lord Chancellor, His Royal Highness said:—

"Let me remind you that the realization of this idea was one of the most cherished objects which my lamented father had in view. After the Exhibition of 1851, he recognized the need of technical education in the future, and he fore saw how difficult it would be in London to find space for such museums and colleges as those which now surround the spot on which we stand. It is therefore, to me, a peculiar pleasure that the Commissioners of that Exhibition, of which I am the President, have been able to contribute to your present important undertaking by giving to you the ground upon which the present college is to be erected, with a sufficient reserve of land to ensure its future development."

The erection of this Institution and the provision of the necessary fittings, machinery, and apparatus, will cost not much less than £100,000, nearly the whole of which sum has been provided by the liberality of the City and of the Livery Companies of London. The building is for the most part five stories high. In the basement are physical laboratories and mechanical workshops, three large shops at the back being top lighted. These workshops and the whole of the south wing have been lent to the Exhibition authorities for the display of School Appliances and Apparatus. The entrance hall is in the centre of the building, and leads to the great corridor which stretches from one end of the building to the other. Class-rooms, Laboratories and Studies for the teaching of Physics, Chemistry, Mathematics, Mechanics and Art, occupy the several rooms on these stories. Passing along the corridor on the right hand side of the entrance hall there is found a small lecture room, and further on a large class room lighted on both sides of the building at a right angle. In the rear are two lecture-theatres, intended especially for the giving out of short courses of communicating the results of research and experiment in all such of these lecture-theatres as are not for the use of the students. In the first floor over the entrance are large and big rooms and stores, now occupied by the exhibition of the Royal Society. The offices of the institutions are set in this floor opposite the great hall, or the hall of the meeting of the Council Chamber, in the wall of which are enframed the arms of the Livery Companies of London.

On the second floor a large room, known as the Museum, contains the apparatus used in the various of the buildings, with glass cases and studies

on the south side. The rooms in the south wing of the building will be mainly occupied by the Physical Department. They will be specially fitted as laboratories for experiments in thermometry, calorimetry, and pyrometry; in the different methods of warming and ventilating; in the reflexion, refraction, and polarization of light and for the construction of optical instruments. Rooms will be arranged for experiments in current and statical electricity; for testing the power and efficiency of dynamo machines; of electric lamps and motors; for experiments in telegraphy and in methods of ascertaining the resistance and capacity of specimens of submarine cables and of underground wires.

On the north side of the building are the rooms belonging to the chemical department.

On the third floor is a large room, 67 ft. by 55 ft., which is intended for a Technological Museum.

At the northern extremity of the building on this floor is a refreshment room for students, and at the opposite end of the building is a large room in the Chemical Department which will be used as a Professor's lavatory. A dark room will be arranged on this floor, and the roof is available for photographic operations, and for chemical operations which need to be conducted out of doors or in the sunshine.

Descending a few steps of the staircase in the north wing, one comes to the general chemical laboratory, for the performance mainly of analytical operations, and intended for the use of first year's students in all departments of the College, and beneath this laboratory are found two other laboratories, in which the larger operations incidental to research and technical chemistry will be carried on. In the space between these laboratories will be placed a gas engine to supply the necessary motive power. The large room at the end of the north wing, on the second floor, will probably be specially fitted with apparatus and instruments for the performance of chemico-physical operations, and for microscopical studies in connection with brewing and other industries. On the same floor is a small class-room and preparation-room: and in the rear, and cut off from the main building, is a room entered by a balcony for operations involving the production of specially objectionable fumes.

The north end of the basement will be occupied by the wood workshop, by a laboratory for experiments in mechanics, and by a shop for the construction of mathematical models. In the rear are three top-lighted sheds, one of which will be used as a drawing office; another, now occupied by machinery exhibits, will be devoted to a mechanics' shop, and the third will be fitted as a mechanical laboratory, and will be furnished with testing machines and other apparatus. Immediately adjoining this laboratory is the boiler room and the engine room, which will supply power for the working of the machines in the mechanics' shop, and will also contain an engine for experimental purposes. To the north of this room, separated by a wall, is a large laboratory to be used for the carrying on of metallurgical operations. The northern wing of the basement belongs to the physical department, and will be utilised for delicate experiments in telegraphy and in the measurement of resistances.

It is expected that the Central Institution will be opened for the reception of students in January next. The fee for the complete course of instruction for

those students wishing to qualify for the diploma, will be £30 per annum; & students will be admitted to special courses on payment of lower fees.

The Clothworkers' scholarship of £60 a year, tenable for two or three years will be annually competed for.

Arrangements will be made for gratuitous courses of instruction to be given in the summer months to Technical Teachers.

THE CITY AND GUILDS TECHNICAL COLLEGE, FINSBURY.—This college, situated in Tabernacle Row, E.C., has for its objects the education of—

(1.) Persons of either sex who wish to receive a scientific and practical preparatory training for intermediate posts in industrial works.

(2.) Apprentices, journeymen and foremen, who desire to receive supplementary instruction in the art practice and in the theory and principles of science connected with the industry in which they are engaged.

(3.) Pupils from middle class and other schools, who are preparing for the higher scientific and technical courses of instruction of the Central Institution.

This college fulfils the functions of a finishing technical school for the entering industrial life at a comparatively early age; of a supplementary school for those already engaged in the factory or workshop; and of a preparatory school for the Central Institution.

The industries or trades to which the courses of instruction specially apply are:—

1. Mechanical Engineering.
2. Electrical Engineering.
3. Industries involving applications of Chemistry.
4. The Building Trades.
5. Cabinet-making and other Art industries.

The instruction consists of lectures, class-lessons and studio and workshop practice. The college comprises a day school and an evening school. The course of instruction in the day school extends over a period of two years whilst the evening course for apprentices and journeymen lasts three years.

The foundation stone of this college was laid by the late Prince Leopold, Duke of Albany, on May 10th, 1881. In his reply to the speech delivered on the occasion by the Lord Chancellor, the Prince said: "The object which the Institute has proposed to itself is a truly national and patriotic one. It has proclaimed its determination to enter into a generous rivalry with other countries in those branches of trade and commerce in which, one must confess, that our native industries have of late years not taken the position which we, as Englishmen, would wish them to occupy. The old apprenticeship system, whatever its merits may be, and whatever good work it may have done in the past, is not equal to the exigencies of the present age; and we are beginning to realise that a thorough and liberal system of education must be placed within the reach of the British artizan in order to enable him to hold his own against foreign competition. When this is done, I believe, as I have said on former occasions, that we need not fear any rival in the world."

In these appropriate words the late Duke of Albany briefly characterised the kind of instruction which was to be, and has since been, given to a large and increasing number of artizan students in the Finsbury Technical College. Less than two years after the foundation stone was laid the new college in Tabernacle Row was opened. The building was erected by Messrs. Peto & Brothers, from designs furnished by the Architect, Mr. E. N. Clifton, under whose direction it was completed. Including the expense of fitting and furnishing the laboratories and workshops, the building has cost over £35,000, towards which the Drapers' Company contributed £10,000. The structure is very simple, without ornamentation of any kind. It consists of three stories besides the basement. On the ground floor to the left of the entrance are two rooms belonging to the Physical Department, under the direction of Professor Ayrton, used for delicate measuring experiments in telegraphy, &c. In the rear, looking into the playground of the Cowper Street Schools, is a large room used for drawing and for experiments requiring the use of steam in organic chemistry; and adjoining this room is a physical laboratory, for experiments in heat. A small class room for general purposes, and a workshop for the preparation of physical instruments are on the same floor. The staircase is in the centre of the building and lighted from the top, and is surrounded on all sides by class rooms and laboratories.

On the first floor are two lecture rooms, each capable of accommodating 200 students—one being used mainly for lectures in chemistry, and the other for lectures in physics and mechanics. The physical lecture room communicates with a large and lofty museum of physical apparatus, and adjoining this are two other laboratories. These rooms are arranged for the carrying on of an organised series of experiments in current and in statical electricity. The peculiarity of the method adopted is that each experiment has all the apparatus required for performing it ready in position, together with printed instructions. The students work in groups of three. The instruments needed for each experiment are mounted on a board, which can be taken to the lecture room for use during the lecture. Examples of such arrangements of apparatus are now on view in the Exhibition. Adjoining these rooms is a small apartment fitted up with drawing tables, in which the students plot out curves, and record the results of their experiments on squared paper. The second floor is mainly occupied by the chemical laboratories. The main laboratory has 96 working places, each of which has two drawers and two cupboards, and is available for two students working at different times. Each bench is covered with a hood, at the top of which are openings at intervals connected with the chimney, in which a draft is produced by the waste heat from the boilers, the flues passing down the benches and along the floor. The laboratory is divided by double-glass screens, between which are the arrangements for the supply of sulphuretted hydrogen for the use of students. Plans of the laboratory fittings are exhibited in the corridors of the second floor of the Central Institution. Besides the professors' and assistants' rooms, there is a class room, a balance room, two store rooms, and a laboratory for advanced students on the same floor. The instruction, which is under the direction of Professor Armstrong, and will remain under his charge until the opening of the

Central Institution in January next, is somewhat different from that of most chemical schools, the object in view being to teach the main facts and principles of chemistry, and to lead the students to observe correctly and to reason from experiment rather than to make them highly proficient analysts. Indeed, the teaching of analysis as in ordinary schools is a **very unimportant** feature in the earlier part of the course.

In the basement of the building is a large room which contains dynamo machines, worked either by the main steam engine or by the gas engine in the same room. The greater part of the building is lighted by incandescent lamps which are supplied with a current from an Edison dynamo machine in the room. Another room in the basement is fitted up as a Mechanical Laboratory, under the direction of Professor Perry, who at present has charge of the instruction in engineering and in mathematics. The apparatus in this laboratory is nearly all of a novel kind. Among other experiments are those on the energy of a rotating body, the resistance of wire to extension and torsion, and of beams loaded and supported in various ways, and of the vibration of the pendulum, &c. Some of the apparatus used in these experiments, portions of which have been made in the school itself, are now on view in the Central Institution. Adjoining this laboratory are two workshops, one fitted with benches and lathes for wood work, and the other with vices and machine tools. These workshops are in charge of a practical mechanic, and the students are able to construct models and machines for their own use and for the use of the college. There is also an engine room containing a boiler and steam engine, which are provided with appliances for measuring evaporation, steam temperatures, steam pressure, &c. On the other side of the playground, in rooms temporarily rented from the Cowper Street schools, are the studios of applied Art, under the direction of Mr. Brophy. These classes are attended mostly by evening students, and the instruction is made to bear as much as possible upon the industries in which the student is engaged. Two or three rooms in this department are devoted to the teaching of drawing, painting, and modelling from life, and special attention is given to designing for the particular trade in which the student is engaged. Examples of the students' work may be seen in the Exhibition.

Nearly all the day students attend the college from 9.30 a.m. till 5 p.m., and follow the complete course of instruction as laid down in the programme, comprising mathematics, mechanics, physics, chemistry, machine drawing, freehand drawing, workshop practice, and French or German. Before being admitted they are required to pass an examination in elementary mathematics. The fee for the season is £9, and there are several exhibitions available for pupils of the middle class schools of the metropolis, and tenable at the college. Evening classes are held in electrical technology, in mechanical engineering, in the applications of chemistry to various industries, in metal plate work, in plumbers' work, in carpentry and joinery, and in bricklaying, in addition to the classes in applied art, which are specially adapted to the requirements of cabinet makers, lithographers, masons, decorators, and designers of all kinds. Illustrations of the methods of teaching adopted in these trade classes form part of the exhibits of the Finsbury Technical College. The fees for the evening classes vary from 6s. to 30s. for the session of eight months. In his introductory

address at the opening of the college, on the evening of February 19, 1883, Mr. Philip Magnus, speaking of the general character of the education to be given in the college, said:—

“ The separate curricula comprise instruction in subjects having a direct bearing on the industry which the student proposes to follow. Whilst the militarist side of education has been kept steadily in view, no subject having been included in these curricula, a knowledge, and an ever-increasing knowledge of which the student will not find it desirable to possess, the methods of instruction adopted are such as will, at the same time, stimulate and develop the reasoning faculties of the pupil. The instruction will be technical in so far as it refers to the career of the student; but it must not be supposed, that because it is in this sense technical, and consequently strictly useful, it is therefore less disciplinary. One of the yet unsolved problems of education is to discover subjects of instruction, which a school-boy, in after life, shall not cast aside as unprofitable, either for the purposes of his daily work or recreation, and the teaching of which shall have the same disciplinary effect as that of other subjects, which for so many centuries have been the sole instruments of education. In this college, an attempt will be made to partially solve this problem, by teaching science with this double object.”

The attendance at the college since it was first opened has shown how great is the demand for technical instruction of this kind. During the past session over 100 students have attended the regular day courses, and over 600 students, many of whom are apprentices, who are admitted at half the ordinary fees, have attended the evening classes.

CITY AND GUILDS OF LONDON TECHNICAL ART SCHOOL, KENNINGTON PARK ROAD.—This school is carried on in two dwelling houses, and in two top-lighted class rooms, which have been built in their rear. The instruction comprises drawing, painting, and modelling from life, lectures on the art of designing and wood engraving. In the wood engraving class, the students work at circular tables, each of which has an elevated block in the centre for the lamp and glass water lenses. The students are required before entrance to have taken the second grade certificate of the Science and Art Department. One evening in each week is set apart for drawing on wood. In the elementary design class the instruction includes of flowers, foliage, natural forms, and the arrangement of these studies in simple designs. In the advanced class lectures are given on the principles of designing and on style. The school is already overcrowded, and funds are greatly needed for its extension. The occupations of the students who have attended the school during the past year have been as follows:—

Designers	35	Modellers	12
Wood Engravers	17	Clerks	6
Stone Carvers	24	Art Students	8
Teachers	14	Draughtsmen	6
China Painters	12	Lithographers	2
Wood Carvers	4	Cabinet Makers	2

Several of the students attending these classes are engaged during the daytime in the Lambeth Potteries; and there can be little doubt of the influence

which this school has exerted in assisting in the development of the important industry carried on by Messrs. Doulton.

Besides having established these important schools in the metropolis, the City and Guilds of London Institute has rendered efficient aid to the advancement of Technical Education by means of the grants which it has made to other Institutions. The new Technical School at Manchester owes its existence partly to the timely assistance afforded by the City Guilds. In this school as many as thirteen Technical Classes have been carried on during the past year in connection with the Institute, the number of students in attendance being 261. At Nottingham, a Technical Department has recently been added to the University College, to the establishment of which the Institute has contributed, and a Technical School is now being erected in Leicester, which has likewise received some assistance from the London Guilds. A department for the practical teaching of Engineering and of Metallurgy is about to be added to the Firth College, Sheffield, to which the Institute has conditionally promised to help in supporting. The Horological Institute, Clerkenwell, in which classes are held for practical instruction in watchmaking, and the School of Art Wood Carving in the Albert Hall, have also received aid from the City and Guilds of London Institute. Since its inception thirty-three of the Livery Companies of London have contributed by subscriptions or donations towards its expenses. The contributions to the Building Fund have already amounted to £56,902, and the annual subscriptions of the year 1883 amounted to £23,470. These amounts, large as they may seem, are small considered in connection with the work undertaken by the Institute; and when it is remembered that Institutions like the Polytechnic of Zurich, and the Technical High School of Munich, of Berlin, and of other places, are maintained at an annual expense of from £15,000 to £20,000 the cost of erection of each school varying from £100,000 to £450,000, it will be seen how greatly the Institute is in need of funds, in order that it may creditably accomplish the work it has undertaken, and enable the people of this country, both artizans and employers, to receive at home as complete a Technical Education as may be obtained in many parts of the United States, and nearly all the large cities of the Continent.

GROUP IV.—THE SCHOOL.**CLASS XXXIV.***(East Central Gallery A.)***Designs and Models of Improved Buildings for Elementary Schools, Infant Schools and Crèches.**

1270. **BROCK, E. P. LOFTUS, F.S.A.**, Architect, 19 Montague Place, Russell Square, W.C.—(1) Plan of the Shaftesbury Home for Boys, Bisley, Surrey, for the National Refugees Society for Homeless and Destitute Children, showing the arrangements of the building in regard to its healthy use. (2) Plans of the German Orphanage, Dalston, for Baron Schröder, showing the arrangements of the building in regard to its healthy use.

1271. **CHAMBERS, P. CAMDEN**, Lowestoft.—Plans and Designs of Improved Buildings for Elementary Schools.

1272. **HENMAN & HARRISON**, 84 Cannon Street, E.C.—Drawings, being plans and views of various public elementary and public middle-class schools erected from our designs during the last ten years.

1273. **NORTH, C. N. McINTYRE**, 15 Boro', High Street, S.E.—(1) Design for reconstruction of St. Saviour's Grammar School, Southwark. (2) Design for Boys', Girls', and Infants' Schools to be erected on a restricted site in a town.

1274. **THE MAYOR AND ALDERMEN OF LEIDEN, HOLLAND**.—(1) Three designs of building of Elementary School for 372 pupils. (2) Six designs of building for the High Burghal School for Young Ladies for 150 pupils. (3) Designs of School Furniture. (4) Six designs of building for a Gymnasium for 150 pupils.

1275. **SIEBREICH, CHARLES**, 4 Mozartgasse, Vienna, Austria.—(1) Designs and Photographs of School Buildings. (2) Technics of Public Health and of Safety of Life.

1276. **CHIAVE, D.**, Municipio di Torino, Italy.—Album with designs of several of the principal school buildings which are now being finished in Turin.

HUMPHREYS, J. C., Albert Gate, Knightsbridge, Hyde Park, S.W. (See *Outside.*)

CLASS XXXV.*(East Central Gallery A.)***Apparatus and Fittings for Warming, Ventilating, and Lighting Schools, School Latrines, Closets, &c.**

1279. **RECK, A. B.**, 3 Thuresensgade, Copenhagen.—(1) Heat and Ventilating Stoves and Hot Air Furnaces for schools, infirmaries, churches, offices, and private dwelling-houses, &c. (2) Publications and Drawings of schools, infirmaries, churches, offices, and private dwellings, &c.

1280. **LONDON WARMING AND VENTILATING CO. (THE)**, 32 Henrietta Street, Covent Garden, W.C.—Gurney Stoves, and Woodecock's Improved Gurney Stove.

1281. **WEEKS, J., & CO.**, Warming and Ventilating Engineers, King's Road, Chelsea.—(1) Weeks's Patent Upright Tubular Boilers, various, including their Patent Duplex, with hollow furnace bars for utilizing the heat of furnace and transferring it to the water before entering the boiler. (2) Weeks's Tubular Water-bar Open Fire Grate, specially constructed for applying to ordinary register stove fronts. For warming nurseries and school-rooms, first, as an open fire; second, by means of pipes round the room, and also for giving a constant supply of hot water for washing and other purposes. (3) Weeks's Hydro-Caloric Vertical Tubular Coil, for warming and ventilating in one operation. For warming the air of the room, for admitting a constant current of fresh warm air, for disinfecting and charging the air with a healthful degree of humidity. (4) Weeks's Horizontal Hot Water Coil.

1282. **HERRING & SON.**—Model of the Warming and Ventilating Apparatus of the City of London School, Victoria Embankment. Also extra strong and cheap Fire Brick Stoves, with tile fronts for smoke-abatement and easy removal of wearing parts.

ADAMS, ROBERT, 7 Great Dover Street, and 17 Blackman Street, Boro', S.E. (See Class 20.)

BACON, J. L., & CO., 34 Upper Gloucester Place, Dorset Square, N.W. (See *Machinery in Motion, Western Gallery.*)

BOWES, SCOTT, & READ, Broadway Chambers, Westminster. (See Class 23.)

DEARDS, W. & S., Harlow, Essex. (See Class 24.)

DOMESTIC ENGINEERING & SANITARY APPLIANCES CO., 24 High Holborn, W.C. (See Class 23.)

FARNWORTH, J. K., 24 St. James' Square, Bath. (See Class 24.)

GENERAL GAS HEATING AND LIGHTING APPARATUS CO., Limited (THE), 54-70 St. Paul's Street, New North Road, N. (See Class 24.)

HAND, HENRY AUGUSTUS, 118 Camden House Road, Kensington. (See *Machinery in Motion, Western Gallery.*)

HOWORTH, JAMES, Ventilating Engineer, Victoria Works, Farnworth, near Bolton. (See *Machinery in Motion, Western Gallery.*)

JENNINGS, GEORGE, Palace Wharf, Stangate, S.E. (See Class 31.)

KEITH, J., Engineer, 57 Holborn Viaduct, E.C.; Edinburgh and Arbroath. (See Class 24.)

LAMB, J. M., & CO., 119 Finchley Road, South Hampstead, N.W. (See Class 25.)

ROSSER & RUSSELL, 22 Charing Cross, S.W. (See Class 24.)

STIRRAT, B. B., 43 Alexander Place, Newcastle-on-Tyne. (See *Machinery in Motion, Western Gallery.*)

WALLER, THOMAS, 43 Fish Street Hill, E.C. (See Class 24.)

WILCOCK & CO., Burmantofts, Leeds. (See Class 23.)

CLASS XXXVI.

(*East Central Gallery A.*)

Special School Fittings for Storing and Drying Clothing.

1285. **MAC CARTHY**, Rev. E. F. M., M.A., King Edward's School, Five Ways, Birmingham.—Model of a School Cloak Room (adapted, with improvements, from the best examples to be found in American Public and Normal Schools), showing Drying Apparatus, Drainage for Umbrellas, &c., now in use in King Edward's Grammar School, Five Ways, Birmingham. (See page 10.)

CLEMENTS, JEAKES, & CO., 51 Great Russell Street, W.C. (See Class 24.)

CLASS XXXVII.

(*East Central Gallery A.*)

School Kitchens and arrangements for School Canteens. Methods of Warming Children's Meals, &c.

CLEMENTS, JEAKES, & CO., 51 Great Russell Street, W.C. (See Class 24.)

GENERAL GAS HEATING AND LIGHTING APPARATUS CO., Limited (THE), 54-70 St. Paul's Street, New North Road, N. (See Class 24.)

LOCH BROS. & CO., 35 Queen Victoria Street, E.C. (See *Machinery in Motion, Western Gallery.*)

NEWTON, CHAMBERS, & CO., Limited, 19 Great George Street, Westminster, S.W. (See Class 24.)

CLASS XXXVIII.

(East Central Gallery A.)

Precaution in Schools for preventing the spread of Infectious Diseases, School Sanitoria, Infirmarys, &c.

1287. PAGET, CHARLES E., Kendal, Westmoreland.—Model, &c. Made of wood, and arranged to show the special details of construction which are desirable in all buildings erected for the reception and isolation of infectious sickness.

1288. WHITE, WILLIAM, F.S.A., 30a Wimpole Street, W.—Winchester College Sanatorium. Illustrations of "Isolation Block," and general plan.

BRADFORD, T. & CO., 140-143, High Holborn, W.C. (See Machinery in Motion, Western Gallery.)

TURNER, GEORGE, & CO., 181 Choumert Road, London, S.E.—School Sanitoria. (See Class 31 A & B.)

CLASS XXXIX.

(East Central Gallery A.)

Special Apparatus for Physical Training in Schools, Gymnasia, Apparatus for Exercise, Drill, &c.

1290. AYLING, EDWARD, Auckland Street, Vauxhall.—Rowing, applicable to Physical Training at Universities, Schools, &c., illustrated by Oars, Sculls, Paddles, and other objects of interest connected with Rowing: such as the Oars used in the Inter-University (Oxford and Cambridge) Boat race, 1884; the Sculls used by Edward Hanlan in his match against Elias C. Leycock; also used by Jefferson Lowndes, Esq., in the Diamond Sculls, at Henley, and the Amateur Championship on the Thames, Season 1883. Sculls manufactured expressly for the Davis Swivel Rowlock. A Racing Scull of a century ago, &c.

1291. LILLYWHITE, JAMES, FROWD & CO., 4 & 6 Newington Causeway, S.E.—(1) Cricket Bats, Balls, Stumps, Leg-guards, Gloves, and other Appliances for the Game. (2) Lawn Tennis Bats, Balls, Nets, Poles, &c. (3) Indian Clubs, Dumb-bells, Quoits, Foils Masks, Footballs, Boxing Gloves, &c.

1292. SCHWEINCKE, C., Kissingen Villa, Mostyn Road, Lower Merton, Surrey.—Patent Apparatus for the Technics of the fingers.

1293. COST, H., Baker Street, Portman Square, W.—(1) H. Cost's Patent Calisthenic Chest Expanders. (To be used in graceful exercises for the healthful and symmetrical development of the human form.) (2) Cost's Wall Spring, and Photographs of Cost's Exercising Plane. (The two last-named instruments are more especially for the healthful development of the muscular system and correction of irregularities of the figure, spinal curvature, &c.)

1294. HORN, T. S., Elgin Road, Croydon.—Patent Improved Regulating Digitormium, a mechanical instrument for exercising the fingers.

1295. HOWARD, PROFESSOR, 100 Wardour Street, W.—Health-producing Games:—Cricket, Football, Lawn Tennis, Indian Clubs, Horizontal Bars, School Gymnasia, Boxes of Games suitable for Children.

1296. ROTH, DR., 48 Wimpole Street, Cavendish Square, W.—(1) A Large Table of Elementary Positions and Exercises according to Ling's System for the development of the various parts of the body. (2) Models and Patterns of hygienic dress, shoes and boots, stays, stockings, &c. (3) Model showing three different School Ventilators. (4) Drawing of a Russian Bath, including the application of steam, cold and warm water in various forms. (5) Diagrams of bad positions during the time of Education causing lateral curvature and other complaints. (6) Diagrams of bad positions while writing. (7) Models of hygienic school benches and chairs, permitting the student to lean comfortably during his occupations in school. (The full-size chairs made according to Dr. Roth's instructions are exhibited by the North of England School Furnishing Co. in the Albert Hall.) (8) Means for the Physical Education of the senses.

1297. HOLM, JOHN, F.R.C.S. (Edin.), 48 Conduit Street, W.—(1) Model of Gymnasium for carrying out Ling's System of Swedish Gymnastics (Educational Section). (2) Diagrams illustrating the Exercises. (3) Literature in reference to the same.

1298. **BACON, GEORGE W., F.R.G.S.**, 127 Strand, W.C.—(1) Bacon's Patent Portable Gymnasium, for home and school use. (2) Bacon's Patent Trapeze and Horizontal Bar. (3) Bacon's Patent Chest Expander. (4) Bacon's Patent Child's Swing, pertaining to above gymnasium.

1299. **PIGGOTT BROTHERS**, 59 Bishopsgate Street Within, E.C.—(1) The Combination Gymnasium, consisting of 2 stained planks, climbing ladder, plain plank, climbing rope and pole, trapeze bar, and lady's swing: is adapted for either indoor or outdoor use. (2) Portable Horizontal Bar, for house or garden, with iron core. (3) Nursery Gymnasium, comprising horizontal bar, trapeze bar, hand rings and swing for children, and horizontal bar for adults. (4) Parallel Bars, portable, for military gymnasium or schools. (5) Jumping Stand. (6) Case of Fencing and Boxing Requisites.

1300. **HARVIE, J.**, Stopford House, Rozel Road, Clapham, S.W.—Improved Double Bar Swing.

1301. **SPENCER, GEORGE**, 52 Goswell Road, London.—Combination Gymnastic Apparatus; Portable Steel Core Bar,—ditto, 30s., Iron Core; Parallel Bar, two sizes. Lawn Gymnasium, Chest Machine, Giant Strides, Nursery Gymnasium, Jumping Stands, Climbing Ropes, Poles, India Clubs, Calisthenic Apparatus, and every description of School or Private Gymnasia and Fencing Requisites.

1302. **GARCKET & NISIUS**, 76 Rue de Rennes, Paris.—Special Apparatus for Gymnasium and Military Exercises.

1303. **GOY, H.**, 21 & 22 Leadenhall Street, E.C.—Gymnastic Apparatus. Specimens of Latest Improvements in Apparatus for the Room or the Open Air, both portable and fixed.

1304. **STEMPEL, ADOLF A.**, Master of Gymnastics, Fencing, Calisthenics & Drilling, Importer of Gymnastic Apparatus. (Herr STEMPEL'S Gymnasiu & School of Arms, Gymnastic Apparatus Depot, 75 Albany Street, Regent's Park, N.W.)—Portable Gymnasium Apparatus, on the German moveable system.

1305. **ZANDER MEDICO-GYMNASTIC CO., Limited**, 7 Soho Square, W.—(1) Chest-Expanding Machine. (2) Machine for exercising the legs; suitable for elderly persons. (3) Machine for exercising the muscles of the ankle. (4) Machine for strengthening the back and correcting stooping in children. (5) Machine for exercising the muscles of the back and chest.

1306. **NORDENFELT, T.**, 53 Parliament Street, S.W.—School Gymnasium, on the Swedish (Ling's) System; manufactured by Mr. Ekstrand in Stockholm.

1307. **KNOFE, OSCAR**, 16 Finsbury Park Villas, Green Lanes, London, N.—All kinds of Gymnastic Apparatus and Fencing Requisites for Schools, Private, Public, and Military Gymnasia, including Horizontal Bars, Parallel Bars, Vaulting Horses, Vaulting Bucks, Vaulting Tables, Jumping Apparatus, Climbing Scaffolds; Family, Parlour, and Lawn Gymnasia, Swings, &c., for children and adults. All kinds of Requisites for outdoor and indoor games, such as Lawn Tennis, Cricket, Football, Croquet, &c.

1308. **CHAMBERS, W. OLDHAM, F.R.I.B.A.**, Lowestoft.—Plans and Designs for Swimming Schools, showing improved system for teaching the art of swimming.

1309. **SLAZENGER & SONS**, 56 Cannon Street, E.C.—Cricket Bats, Lawn Tennis Rackets.

CLASS XL.

(*East Central Gallery A.*)

Literature, Statistics, Diagrams, &c., relating to Group 4.

ETZENBERGER, R., Midland Grand Hotel, St. Pancras. (*See Outside.*)

ROTH, DR. M., 48 Wimpole Street, Cavendish Square, W. (*See Class 39.*)

SCHMIDT, KARL AUGUST, 2 Konstantinow'sche Militair-Schule, St. Petersburg.—Books and Diagrams illustrating correct positions in walking, standing, or sitting. (*See Library.*)

WHITE, WILLIAM, F.S.A., 30a Wimpole Street, W.—Æsthetical Sanitation, showing the Influence of the Healthy Culture of the Body on Beauty and Art. (*See Library.*)

DIVISION II.—EDUCATION.

GROUP VI.—EDUCATIONAL WORKS AND APPLIANCES.

CLASS XLVII.

(Royal Albert Hall.)

Crèches and Infant Schools.—(a) Apparatus and Fittings for Crèches and Infant Schools; (b) Games, Toys, and Kindergarten Amusements; (c) Models and Appliances for teaching; (d) Examples of School Work.

1370. **NEWMAN, O., & CO.**, Kindergarten and Educational Warehousemen, 40 Cheapside, E.C.; 7 Trafalgar Buildings, Charing Cross, W.C.; and at Berlin.—Collections of Kindergarten materials and appliances for primary instruction, according to Froebel's System, adapted for school and home use, showing the materials in various degrees of development adapted to the various branches of primary instruction. Specimens of sewing work done on outlined cards, which, after having been pricked with a needle, are worked out with wool. House, made by the Sticklaying Occupation, giving an idea what pretty patterns may be produced even with such simple materials as little wooden sticks. Also a pea-work model of a church, and two sets of models put together according to diagrams. Specimens of weaving mats and a new patented improved steel weaving needle. White Composition Stone Slates. A new method of teaching the multiplication table. The manufacture of paper and silk is illustrated by specimens of the various raw materials, and the changes these have to undergo before becoming an article of commerce. Series of Animals one-seventh natural size, for object lessons in Elementary and Kindergarten Schools. (See also No. 1453, Apparatus for Science Teaching.)

1371. **DRUKKER, MORRIS**, 61 Stamford Road, Kingsland, N.—(1) Games of various kinds. (2) Toys (educational and otherwise). (3) Kindergarten amusements. (4) Building Bricks, &c., &c.

1372. **FARMER, M.**, Albert Works, 34 & 36 Britten Street, Chelsea, S.W.—Kindergarten Educational Printing Apparatus.

1373. **MILLER, S. A.**, Orange House, College Park, Lewisham, S.E.—(1) Reading and Writing, a series of cards. (2) Script Copies; Slates and Paper to match. (3) Letters and Words, sorted; in boxes, with key. (4) Select Rhymes, for Reading and Recitation. (5) First Sumas, on Cards. (6) Bead Strings, varied. (7) Infants' Musical Staff and Notation, with Songs. (8) Children's Work.

Existent pressure, along with the many queries as to modes of education, would seem to indicate that we may not as yet have found the right method to work with children. We are beginning to discover some facts about them; in particular, that the "restlessness" hitherto regarded as a main hindrance is, in fact, a helpful force, and we are doing something to provide scope for its exercise.

Yet much is lacking. What is it? Scope for activity, even if provided (and we are only on the way to this), is not the only thing required. Unless properly trained to such work as we give them, our children become careless as to its quality, and, in the same proportion, indifferent to their task—not found interesting. They have to be reminded that "strictness is the condition of rejoicing," and to be helped to realise the fact. And how? Outward checks are of course needful, but the higher and truer work is to evoke the critical faculty latent in each child, and set it to work upon himself. Children's knowledge is always in advance of their practice. Eye and ear can criticise defects of hand and voice, and should be set to do such work as they could, instead of leaving it to a teacher. A habit of self-criticism once induced, we should clearly be far on the way to real moral culture, now theorised about, rather than practically secured. A further step would be gained in the recognition of children's sociable proclivities by setting them both to help and criticise each other. Training would be needed here also, and specially; but returns would so certainly prove fruitful in good, that all time and effort devoted to the object would be found wisely expended.

The initiation of such work calls for special consideration. It may well claim time for itself, seeing that, in the nature of things, it would be needed but once. Restricted aims and clear direction (within such narrow limit) would be found essential conditions of success; but, these secured, much might be accomplished in a short time, far more than would appear likely, inasmuch as, if working wisely, we carry the children with us.

1374. **VEREIN FÜR VOLKERZIEHUNG UND VOLKSKINDERGARTEN**, Potsdamerstrasse, Berlin (DR. EDMUND FRIEDEMANN).—Collection of Appliances, &c., illustrative of the Froebel Pestalozzian System of Kindergarten Teaching.

1375. CREMER, W. H., 210 Regent Street, W.—(1) Games and Recreations of an amusing and intellectual character. (2) Out-door Sports and Pastimes conducive to health. (3) Educational Toys and Kindergarten Appliance in all its branches. (4) Building Bricks of Wood and Stone, Mosaic. (5) Alphabets and Spelling Games. (6) Dissected Maps. (7) Scriptural and Secular Subjects. (8) Boxes of Tools. (9) Printing Presses with moveable types. (10) Colour Boxes and Exercises. (11) Special Top for infants and the nursery. (12) New Patent Soft-stuffed Animals. (13) Model Rag Dolls and Toys of white wood. (14) Practical Miniature Cooking Stoves. (15) Model Dolls' Houses. (16) Appropriately Furnished Shops of various kinds, with weights, scales, &c.

1376. GUTHRIE, PROF. F.—Collection of objects to illustrate the Exhibitor's 'First Book of Knowledge.'

1378. J. RAMSAY COOPER, 17 High Street, Canterbury.—Boards with revolving or sliding arrangements and reading sheets, for teaching children the English language by a graded method of phonic word-building with the ordinary orthography. 1st step.—The vowels used in their primary powers. 2nd step.—The vowels used in their primary powers, preceded by a consonant. 3rd step.—The vowels in their primary powers, preceded and followed by single consonants, with *silent* final "e" as in "lake," "ride," "home," &c. 4th step.—Vowel-digraphs in which the first vowel is vocal and the second silent as in "pain," "boat," "seat." 5th step.—Vowels and vowel-digraphs as above, with double consonants. 6th step.—Vowels used in their secondary (or short) powers, as in "man," "ten," "pin," "log," "run." 7th step.—Vowels and diphthongs represented by irregular orthography. 8th step.—Consonant variations. 9th step.—Special exceptions.

1379. MAGNUS, DR. HUGO & JEFFRIES, DR. B. JOY.—Colour Chart for the Primary Education of the Colour-sense, published by L. Prang & Co., Boston, U.S.

EDWARDS, H. & G., 84 High Street, Camden Town, N.W. (See Class 48.)

HAMMER, GEORGE M., 370 Strand, W.C. (See Class 48.)

MIDLAND EDUCATIONAL CO. (THE) (Manager, A. TAYLOR), 91-92 New Street, Birmingham. (See Class 48.)

MYERS, A. N., 15 Berners Street, Oxford Street, W. (See Class 48.)

NORTH OF ENGLAND SCHOOL FURNISHING CO., Limited, Darlington, Durham. (See Class 48.)

CLASS XLVIII.

(Royal Albert Hall.)

Primary Schools. (a) Apparatus and Fittings: (b) Models and Appliances for teaching: Text-books, Diagrams and Examples: (c) Specimens of Work in Elementary Schools.

1380. MIDLAND EDUCATIONAL COMPANY (THE) (Manager, A. TAYLOR), 91 & 92 New Street, Birmingham: and 7 Market Street, Leicester. (1) The Reliance Desk. (2) The Paragon Desk. (3) The Birmingham Dual and Single Desk. (4) The Midland Dual and Single Desk. (5) Varieties of Mistresses' Work Tables. (6) Apparatus and Fittings for Infant Schools. (7) School-work Tables.

1381. TAYLOR & CO., Driffield, Yorkshire; & 62 St. Martins-le-Grand, London.—(1) The Yorkshire School Board Desk, a long fixed locker desk, with a separate hollowed seat and back for each scholar. Adopted in a number of large board schools. (2) Dual Desk, with broad turn-up flap and extra strong joints, as used in board schools in London and elsewhere. (3) The "Yorkshire" Convertible Desk, forming at pleasure desk, table, or backed seat. (4) The "Yorkshire" Master's Table, containing two cupboards, two drawers, and lock-up slope. (5) Improved "Swedish Pattern" Single Desk, with seat to fall back. (6) Single Desk, on Gothic pattern, iron standards. (7) Bookcase for class-rooms in colleges, &c., having shelves for books and divisions for folios or slates. (8) Cheap Portable Mahogany Bookcase for teachers, private rooms, &c. (9) Seats for lecture halls and schools; fixed and reversible backs. (10) Improved Hat and Coat Hooks, made from steel wire, &c., &c.

1382. ST. JOHN'S INSTITUTE FOR DEAF AND DUMB, Boston Spa, Rotherham, Yorkshire.—(1) A Self-fastening Reversible School-desk. The desk top is held in position by a small latch which falls into notches on the inner side of a semicircular piece of

iron attached to the desk. The advantages claimed for this desk by the exhibitors are:—
 1. Simplicity of construction. 2. It is self-fastening, and hence, 3. There is no danger of the desk overturning in class, from it not having been properly fastened, or having been loosened by children. 4. There are no pins, keys, screws, or springs, to get lost or worn out. (2) An Infant Gallery, consisting of steps, seats, and back to seats, screwed on to iron standards. The advantages claimed for this gallery are, 1. It is inexpensive, for it is sent out so that it can be fitted up in a few hours, thus saving expense of skilled labour. 2. It consists of steps and seat in one, so saving expense of obtaining gallery seats. 3. It is compact and looks well. The rails, backs and risers of steps are made in varnished pitch-pine. (3) A School-chapel Desk, a desk for use in schools and also at times for divine service. There are several hundreds of these school-chapels in the country recognised by the Education Department. This desk is the same as the Reversible Desk, with the addition of a hinged kneeling-board, rendering it useful also as a Church seat or kneeling desk. (4) A cheap form of Box Desk. All the wood-work of this desk consists of board's screwed on to the iron standards, thus dispensing with the joiner's labour. (5) A Hat and Cloak Rail. This may be moved into the middle of the room at the beginning and end of school. The children, passing on each side, hang their hats or coats on their own nails as they pass. By this means the ten minutes usually spent in giving out clothes is saved. It may also be moved before the fire to dry the children's clothes when necessary. There is likewise exhibited here, a Dresser for use in School-chapels; a Demonstration Frame, as recommended by the School of Needlework for teaching children sewing. Wire frames for the same purpose, and also for teaching darning.

1383. EDUCATIONAL SUPPLY ASSOCIATION, 42a Holborn Viaduct, School Apparatus and Appliances. Desks of best seasoned wood, strongly made for rough wear, low in price in several patterns, to meet the various wants of different class schools. Elegance of design and ornamentation have been attempted, but not at the sacrifice of strength and utility. The latest improvements have been carefully studied in the manufacture of the furniture, but all mere useless novelties have been excluded. A variety of school diagrams are shewn, including a new set of twelve "trades" suitable for infant schools and lower standards generally. Certificates of merit and for examination, quite new in design, medals, special bindings for prizes, reading sheets, manuscript reading and writing sheets, books of every description, suitable to latest Government requirements for elementary schools, are also exhibited.

1384. THE NORTH OF ENGLAND SCHOOL FURNISHING CO., Limited, Darlington.—School Desks and Seats, and Educational Apparatus and Furniture for Elementary and Art Schools. (1) The Modern Adjustable Desk with Dr. Roth's Chair has the following features:—Desk and Chair adjustable to the requirements of each pupil in height, in distance of desk from chair, and in the arrangement of the pad for back support. The seat is deep and thus supports the thigh. An inclined support is also provided for the feet. In illustration of the utility of such a desk and chair, the Company exhibits diagrams of pupils in good and bad positions. (2) A Desk and Seat for two scholars is also similar to the above, and made in accordance with the principles of Dr. Roth (see Group 4, Class 39). (3) In addition to the above, the Company exhibits various Single Desks, Glendenning's Patent Music Chair, Dr. Roth's Chair for home and school, Glendenning's Patent Adjustable Table, which can be raised to any desired heights for reading and writing, either while sitting or standing, the Dual Desks as supplied to the City of London Schools, &c., &c. (4) The Darlington Slateboard, being as light and unbreakable as a blackboard, but with a surface equal to the best Welsh slate. (5) The Darlington Abacus and Slateboard, for the teaching of numeration and notation. (6) The Darlington Model Map of England, fitted in a trough which will hold water, designed to give scholars a correct notion of the physical features of the country. (7) A Photograph of the same, showing the hills and valleys and rivers in relief. (8) The Kensington Art Tables and Easels. (9) Ablett's Glass Plane and Object Stand, designed by T. R. Ablett, instructor to the London School Board, and intended to be used in teaching the principles of perspective. (10) The Darlington Secretaire, designed and constructed for the use of art students and architects, being fitted with materials for their use.

1385. GEORGE M. HAMMER & CO., 370 Strand, London, W.C.—The intention of this exhibit is to show Furniture and Apparatus used in schools of various grades, from the Infants' to the Arts' School, and consists of—(1) Kindergarten Table and Chairs, Infants' Desk and Seat for writing or Kindergarten purposes; Lesson Stands, Abacus, Easels, Blackboards, Cabinet of Objects, Box of Form and Colour, with Diagrams. (2) Long Desks, "Phoenix" and "Osborne" patterns, forming into Backed Seats for Lecture Rooms; Clock, Cupboards, Masters' Desks, Mistresses' Tables, Large Slate in Stand, Cap and Cloak Hooks on Stands. (3) Moss's Patent Dual Desk, adapted to prevent stooping, and with most suitable inclination of Desk and Bookboard, to prevent injury to the sight. This is the desk with which all the London Board Schools are furnished. The "Imperial" and other Dual Desks. (4) Single Desks of various patterns. "The Louise," "Albany," "Bedford" "St. Paul's," &c., fitted with backs to the seats,

arranged to prevent stooping, and to give complete isolation. Very largely used in superior schools for girls. (5) Drawing Deaks, with Copy Rack, Stools, Camel, Easel, &c. (6) Drawing Models, various; "Miller's" Class Models in Wood and Wire, adopted by the Science and Art Department. Meers, Geo. M. H. & Co. also exhibit Laboratory Tables, Fume Closets, Microscope Tables, &c., in the Working Laboratory on the grounds of the Central Technical College: Deaks for the Oral Instruction of the Deaf and Dumb in Room 32; and Sunday School Furniture, in the exhibit of the London School Board.

1386. EDWARDS, H. & G., 84 High Street, Camden Town, N.W.—(1) Kindergarten Table and Chair. (2) Models of Infants' School Galleries. (3) Form and Colour Box. (4) Clock Face. (5) School Deaks (various). (6) School Seats and Forms. (7) Black Board. (8) Easels. (9) Abacus Frames. (10) Drawing Models. (11) Boxes of Bricks, &c., &c.

1387. WAKE & DEAN, 40 Borough Road, S.E.—The beneficial results of the new activity which Mr. Forster's Act infused into every department of educational work are nowhere more apparent than in the enormous improvement which has taken place in school furniture, especially in the most important article of school furniture—the desk. The antiquated desk, in which a child could neither sit nor stand at ease, and which tended at once to narrow the chest and curve the spine, has given way to various desks constructed with an intelligent regard to the health and comfort of those who use them; and the ingenuity of manufacturers has produced desks which serve their primary purpose none the worse because they also make good seats and tables.

The Borough Dual Board School Desk is constructed on physiological principles. There is a rest for the back at the proper height, and also a rest for the feet. In desks where the seat and top are both immovable a child cannot stand upright; in this desk the lower part of the top lifts on a hinge, and advantage is taken of it as a stand for the reading book. Each desk being separated by an interval from the next a free circulation of air is possible, and the teacher can get to the side of every pupil.

In the *English Desk* there is no flap, but the seat turns up, and thus the benefits of the preceding desk are secured. The box-top of the *English Desk* is very handy where the pupils provide their own books.

The British Single Desk is a modification of the *English Desk*. It is specially adapted for schools where space admits of the pupils being isolated.

Of "Convertible Desks" the *Southwark* is a good specimen. With the top inclined slightly it forms an ordinary school desk: with the top turned down it forms a comfortable backed seat; two desks placed together with the tops vertical make a capital table.

The Improved Desk has all the advantages of the *Southwark* with two great ones of its own: it always faces the same way, and the seat turns up.

The Kindergarten Desk is intended for very little children. The top is flat, to keep the sticks, peas, bricks, &c., of the "gifts" from rolling. The squares marked on it will prove very useful.

The Southwark Slate Board combines the advantages of the two materials from which it is made. It is lighter than slate, unbreakable, it cannot warp, and its surface never gets shiny.

The Head Master's Desk, Mistress's Work Table, and the Book Cases are all of new design.

1388. HEYWOOD, JOHN, Ridgefield, Manchester.—(1) Swiss Desk, with movable sliding top, pitch pine, varnished. (2) Argillite Black Boards. (3) Reversible Back Forms, pitch pine, varnished. (4) Fixed Back Forms, pitch pine, varnished. (5) Kindergarten Desk, top lined in one-inch squares, pitch pine, varnished.

1389. GEORGE E. HAWES, School and Church Furnisher, Duke's Palace, Norwich.—Special patterns of single desks for use in High Grade and other schools, of a form well adapted to the comfort and health of the pupil where complete isolation is required. The Norwich School Desk, the Birmingham Desk, the Norwich Dual Desk, and the Norwich Locker Desk, are types of desks equally applicable to the dual or continuous desk. The East Anglian Convertible Desk is so constructed that by means of a spring bolt it can be instantly converted into a comfortable seat with back, to a table with seat combined, or to an ordinary desk and seat. Infants' desks, marked and arranged for Kindergarten exercises; an improved infants' gallery, fitted with hanging flaps marked for Kindergarten exercises, and supported on brackets arranged in such a manner as to be used as an ordinary gallery with seats only, or as seats and desks combined, all under the control of a child. A combined Pupil Teachers' Desk, with cupboard for stationery, platform and seat. Sliding blackboard in hard wood frame. Framed blackboard, specially prepared for chalk, and of extreme lightness. Easel of hard wood, with pointer, chalk box, and support for maps, complete, and adjustable card stand, mounted on cast iron base and castors.

1390. BORN, PHILIP, 29 Tavistock Road, Westbourne Park, W.—Improved Portable Desk, with movable seat, for home tuition, will prevent curvature of the spine and round shoulders. The seat and footboard can be fixed to suit any age from 6 to 16.

1391. CURWEN, J., & SONS, 8 Warwick Lane, E.C.—Diagrams, Pamphlets, and Books, used in teaching music by the Tonic Sol-fa method and notation, and by the Staff notation.

1392. GARCET et NISIUS, 76 Rue de Rennes, Paris (Agents, ÉMILE FOUCARD & CO., 23 & 24 Hop Exchange, Southwark Street, S.E.)—(1) Furniture and Apparatus for infant schools and elementary schools. (2) Apparatus and Appliances for teaching drawing and natural science. (3) Apparatus for handicraft teaching.

1393. HODKINSON & CLARKE, Canada Works, Small Heath, Birmingham.—(1) School Fittings. (2) Desks, constructed to facilitate the work of education and to meet in the fullest manner the requirements of the laws of health. (3) Revolving Partitions for the division of school-rooms.

1394. REDMAYNE, MAY, & CO., Triumph Works, London Road, Sheffield.—Patent Hallamshire Convertible Desk. This desk is of neat design, strong without being heavy, and made from the best pitch pine. By means of a simple and easy mechanism this desk can be adapted to a variety of uses, being convertible into a table and seat, flat or sloping desk, or comfortable backed seat. This desk gained the Silver Medal at the Dublin Exhibition in 1882.

1395. BOGHANDEL, MALLINGS, Christiania, Norway.—Educational appliances of various kinds for primary school teaching.

1396. HAARBURGER, C., & CO., Hamsell Street, E.C.—School Desk and Seat.

1397. SIMON, H., & CO., Haide Strasse 55, 57, Berlin, Manufacturers of School Desks, &c.—The Normal School Benches are manufactured in six different sizes, suitable for distinct ages (for instance, Class I. for children of 6 to 8 years old); they are made of cast iron standards and wood seats and flaps, the table flaps are divided and in one length, which can be thrown back to permit an easy cleansing of the floor. Particularly convenient for girls' schools are the desks divided by their length and depth, enabling them to be slantingly arranged, so as to form convenient reading desks, and when completely folded back yield the necessary free space between bench and table for needlework and other feminine employment. By placing the school benches at less distance (i.e. the seat extends 3 to 5 centimetres under the desk) the children are compelled to sit upright, thus preventing curvature of the spine, high shoulders, and shortness of sight. The children's desks are constructed in accordance with medical directions for home use, and the seat can be raised or lowered so as to suit every age from 6 to 16. The same result is obtained by the children's desks as by the Normal School Benches.

1398. MYERS, A. N., & CO., 15 Berners Street, London, W.—The Kindergarten System of Infant Education, although originating in Germany many years ago, has been for several years past more systematically and generally adopted in England. Messrs. A. N. Myers and Co. began to introduce the various Kindergarten materials and occupations to public notice about 35 years ago, at a time when the Kindergarten system was as yet unknown to English educationists in general. The firm has also since that period been engaged in the publication of numerous models and appliances to illustrate and render easy the elementary study of mathematics, mechanics, physics, natural history, arts, and manufactures, as well as producing a variety of toys and games of an educational tendency. Some of the firm's publications, which are particularly well suited for the education of the blind and of deaf children, have been adopted by several institutions; and publications for promoting physical training without apparatus may also be specified.

1399. LAURIE, THOMAS, 31 Paternoster Row, E.C.—(1) School Apparatus and Fittings. (2) Diagrams and Examples. (3) Books and Models.

1400. CROSTHWAITER, R. W., Union Foundry Warehouse, Paul's Wharf, 24 Upper Thames Street, London, E.C.—Crosthwaite's Improved School Desk. This desk adds to all the latest improvements a special advantage, viz. that although a folding up desk, it is impossible for the scholars to get their fingers between the parts folding up and that remaining fixed, as it has not a long hinge but works on a centre. The construction allows it to be transformed from a thoroughly safe and strong school desk into a reading desk with book rest, and at the same time permitting free ingress and egress.

1401. SWANZY, H. R., F.R.C.S., 28 Merrion Square, Dublin.—School-room Desk and Chair (for one child); capable of being adjusted to suit a child at different ages.

1402. SCHMARJE, F., Rector, Hamburg.—Method of teaching calligraphy invented by the Rev. J. Schmarje, of Hamburg. In this system particular attention is paid to the position of the pupil, and great stress is laid upon the manner of holding the pen or pencil, and upon

the position of the paper or slate to be used, which should be at an angle of 35° or 40° ascending from left to right, it being claimed that this position is best suited to the natural motion of the hand.

1403. BACON, G. W., F.R.G.S., 127 Strand, W.C.—(1) Series of School wall-maps, size 4 by 5 feet, England, Scotland, Ireland, Europe, Asia, Africa, others in progress. The special features are distinctness, bold clear lettering, no crowding, accurate outline, towns boldly shown by red dots, rivers in blue, hills in brown, railways in a special colour. Test maps formed by omitting names. (2) Picture Lessons in Natural History, 40 in the series, size 28 by 24 inches. They are coloured true to nature, and under each picture is a concise description of the animal and its uses, printed in bold letters for class teaching. (3) Picturesque Geography, size 15 by 22 inches. This series consists of 12 chromo-lithographed views of the principal features of Physical Geography, intended for art decoration in schools, and accompanied by 24 pages of description. (4) Picture Lessons in Geography for Standard II. 7 charts, 30 by 22 inches. Intended for imparting a knowledge of the simple facts of Physical Geography. (5) Pictorial View of the World. (6) Picture Alphabet. (7) The Grammar Tree. (8) Quarto Atlas of the British Isles, 100 maps with letterpress. (9) Bacon's Health Books. (10) Cosmographical Clock, surmounted with globe showing day of month, seasons, &c. (11) Cosmographical Globe.

1404. MAC CARTHY, REV. E. F. M., M.A., King Edward's School, Five Ways, Birmingham.—Model of a Class-room, showing Continuous Black Board, Master's Dais, and Fittings complete. The chief object of this Exhibit is to make the "Continuous Black Board" more widely known as a most effective piece of school apparatus. The surface used as a "black board" is formed by $\frac{1}{2}$ in. of Parian cement placed on the brickwork so as to be level with the rest of the (plastered) wall. Along the top runs a deal moulded capping, and along the bottom a narrow trough (to hold chalk and rubbers), $2\frac{1}{2}$ in. wide, with oak beading. The surface is 2 ft. 6 in. deep, and runs round three sides of the room at a height of 3 ft. 3 in. from the floor—except for the 9 ft. above the master's dais (10 in.), where it stands 3 ft. 8 in. above the top of the dais. The cost (exclusive of blackening) was, for the class rooms of the above school, 2s. 6d. per lineal foot. The rubbers, of which there should be one for every two scholars that the Board can accommodate, are of deal, $5\frac{1}{2}$ in. long, $1\frac{1}{2}$ in. broad, $1\frac{1}{2}$ in. high, with one surface covered with rough corduroy nailed to the sides. Cost, 2d. each. The prominent advantages of the Continuous Board are:—(1) It affords the teacher a sufficiently large surface of board to admit (a) of his completing a demonstration without having to obliterate the first part of it for want of space, or (b) of leaving demonstrations, formulae, grammatical lists, genealogical tables, and other memoranda in the face of his class for any length of time; (2) It enables him to test simultaneously the knowledge, and methods of working of his class in a great variety of subjects, such as, map-work, mental arithmetic, mathematics, grammar, mechanics, &c., while each pupil is estimated by the public exhibition of his work; (3) It practically adds to the accommodation by abolishing easels, and presenting to a more widely visible surface. The model shows an electric bell, by means of one of which in each class room simultaneous time is kept all over the building. Great care has been bestowed upon the dimensions of the single desks, the models of which have been made for this Exhibit by Messrs. Illingworth, Ingham, and Co., of Leeds, the makers of the desks in use in the school.

Special School Fittings for Storing and Drying Clothing.

Model of a School Cloak Room (adapted, with improvements, from the best examples to be found in American Public and Normal Schools), showing Drying Apparatus, Drainage for Umbrellas, &c., now in use in King Edward's Grammar School, Five Ways, Birmingham. The object of this Exhibit is to show what can be done at a moderate cost, to promote health, inculcate habits of tidiness, and teach respect for property, in connection with school cloak rooms. The fittings of the cloak room (details of which are given below), have been designed in order (1) to isolate each scholar's outdoor clothing, so that the risks of the spread of infection may be largely diminished, and that the wet coat of one boy may not saturate the dry coat, or stain the light coat, of his neighbour; (2) to provide a system of umbrella-drainage, by which the fetid and discoloured drippings of many (cheap) umbrellas may be at once carried outside the building; (3) to subject each separate coat and umbrella to a current of hot air, and, at the same time, to obtain such a length of hot-water pipes as will raise the temperature of the room sufficiently to dry wet clothes in the interval between assembly and dismissal; (4) to reduce to a minimum the temptation to pilfer; (5) by giving each boy's umbrella a place for deposit in his own compartment, to prevent delays and confusion at dismissal, and check changes of ownership, accidental or otherwise; and (6) to introduce the scholars to perfect order and system at the very threshold *each day's school-work*, and by this and other arrangements, conceived in a like spirit throughout, to develop naturally, an abiding sense of the first principles of self-discipline and morality.

The following are the detailed dimensions:—Height of partition, 5 ft. 4 in.; width, 1 ft. 2 in.; depth, 8 in.; height of ledge for gaiters, 1 ft.; height of hook for umbrella, 2 ft. 6 in.; width of drainage-trough, 3 in.; length of hot-water pipes for 120 partitions, 122 ft.—*Drainage-Troughs*.—On an asphalted floor, these are formed by sinking runnels in the asphalt. On a wooden floor, the side troughs are made by two beads cased with zinc, and the main trough is sunk in the boarding of the floor and also cased with zinc. The main channel communicates with the outside drainage. The lower panels of the door of the cloak room are fitted in with perforated zinc, in order that a current of air may be kept up through the room to carry off the vapour arising from the wet cloths when heated by the hot-water pipes. Three of these cloak rooms are in use at the above-named school, for the accommodation of 360 boys: the fittings for which were erected at a total cost (exclusive of hot-water pipes) of £105. (Class XXXVI. *East Central Gallery A.*, No. 1285.)

1405. KELLETT, JOSEPH, Laisterdyke, Bradford, Yorkshire.—*The Royal Easel*. There are two considerations of great importance connected with the School-Easel. (1) It is continually in use, and should therefore be thoroughly adapted to the teacher's requirements. (2) It stands prominently, and always, straight before the eyes of the class, needing more than any other object in the school to be of pleasing design. The Royal Easel, as supplying these desiderata, has a large board, under easy and entire control, enabling the teacher to do his work with precision and pleasure. The board is sufficiently inclined, and can be ruled with the T-square. If required, it can be taken off and used as a drawing-board, in higher or art schools, for demonstration drawings. The T-square pointer is the handiest and neatest form of T-square for blackboard usage. It is provided with scale 6 in. to the foot, for class teaching of "Drawing to Scale;" the bold marking of the scale enabling scholars to see the method of taking and laying down dimensions. It is better adapted for blackboard ruling than the common T-square, for having a thick blade, lines of various strength can be drawn, and with greater celerity.

1406. WALKINGTON & BROS COMB, 19 Cursitor Street, E.C.—(1) Walkington & Broscomb's "Paragon" Writing Slates. The slate is firmly cemented into deep grooves, making frame and slate one solid whole. (2) Slate Ruling, suitable for the various standards in public elementary schools. (3) Class Copy Books for teaching writing from the blackboard. (4) Blackboard ruled for the "Class System."

1407. SMITH, C., & SON, 63 Charing Cross, S.W.—Educational Wall Maps, Diagrams and Globes.

1408. CLARKE & SHRAPNEL, 37 Walbrook, London, E.C.—Patent Imperishable Diagrams, for Educational Purposes, comprising Specimens of Geographical Subjects, Plants, Common Objects, Animals, Mechanical Powers, Tonic Sol Fa Modulator, and Diagrams for Technical and Scientific Purposes.

1409. TERRY, C., & CO., Little Denmark Street, Soho, W.C.—The decoration of mission-rooms, schools, sick wards, &c., has hitherto been attended by a great drawback, viz., the difficulty of obtaining suitable designs made in such a manner that the fixing is easy and attended with little cost. For cottage hospitals and convalescent homes loose paper pictures are frequently prohibited, nothing being allowed on the walls that cannot be readily cleaned, frames being specially objected to as harbouring insects. The exhibit of Messrs. Terry and Co. embraces a selection of scripture subjects, both printed on paper and in oil colour on canvas. Six cartoons in sepia tint on gold background, form part of a series of 22 pictures illustrating the life of our Lord; any paper-hanger can affix these to plaster or brickwork, and the entire cost would not exceed 4d. per square foot. Selected specimens of a cheaper series (picture and reading combined) are also shown. These being a publication of the Society for Promoting Christian Knowledge, are well known and extensively used for wall decoration. They are cheaper than paperhanging, the cost being less than one penny per foot. Two samples of oil colour on canvas, "The Last Supper" and "Our Lord disputing with the doctors," are specimens of work that can be reproduced at a cost of 4s. per square foot. Texts in oil colour and washable, which, made by hand, cost 2s. 6d. to 3s. 6d. per foot, are now made by machine printing at one-third the cost. Specimens are exhibited in tints and colouring suitable for wall decoration.

1410. JOHNSTONE, T. RUDDIMAN, Waverley Works, Murrayfield, Edinburgh.—(1) Elementary Geography comprises near and distant view of land, geographical terms, mariner's compass, &c. (2) Standard Illustrations; being illustrations specially prepared to meet the geographical requirements of the 1884 Code. Diagrams for Standards V., VI., and VII. (3) Human Anatomy and Physiology recently prepared under the direction of Dr. Andrew Wilson on the most modern methods of teaching this subject. Each sheet is accompanied by a handbook. Sheet I. contains the Skeleton, Muscular System, Digestive Organs, &c. Sheet II. contains the Organs of Digestion, Circulation and Excretion. Sheet III. contains the Nervous System and Organs of Sense. (4) Maps of Europe, Africa and India, being three specimens of

T. Ruddiman Johnstone's series of Universal School Maps, as used by the London and leading school boards. (5) England Test Map, being a specimen of one of the above series, with coast line, rivers, hills, boundaries, town marks, and fully coloured, but without names. Maps of the series are published in this way. (6) Mariner's Compass, mounted on cotton, rollers, and varnished, or on strong board varnished. This is a pictorial sheet, showing the Pole star and how an observation is taken, the magnetic pole, variation of the compass, the thirty-two points of the compass, and how positions are reckoned by points or degrees. (7) Historical Prints. The series consists of (1) Magna Charta, (2) Queen Elizabeth and her Court, (3) Oliver Cromwell dissolving the Long Parliament, (4) The Restoration.—The landing of Charles II. at Dover, (5) The Battle of the Boyne, (6) Death of Lord Nelson on board the 'Victory,' being reproductions of old prints in colours, chiefly after the works of Sir B. West, P.R.A. (8) River Basin of the Thames. Adopted by the London School Board. This map shews by contour lines the elevation of the land at each 100 feet. The shade of colour between the contour lines is altered at each 100 feet, and the gradual elevation is thus clearly depicted. The map also shows canals, county divisions, important towns and two sections across the Thames Valley.

1411. JOHNSTON, A., 6 Paternoster Buildings, E.C.—(1) Diagrams of Physiography, with keys. (2) Map of British Empire. (3) Useful Plants, with description. (4) Forest Trees—trees grown for their wood. (5) Fruit Trees—trees grown for their fruit. (6) Useful Grains, with description. (7) Natural History Plates. (8) Free-hand Outlines. (9) Certificates. (10) Mental Arithmetic Cards. (11) Standard Copy Books.

1412. DEYROLLE, ÉMILE, 23 Rue de la Monnaie, Paris (Agents ÉMILE FOUCARD & CO., 23 & 24 Hop Exchange, Southwark Street, S.E.)—(1) Models and Appliances for teaching. (2) Apparatus and Models for elementary science teaching in schools (Musée Scolaire).

1413. RICHARDSON, JOSEPH, Wesleyan School, Oxford.—(1) *Practical Geometry Designs*. These are not copies, but a large number of problems worked out and grouped so as to form a design. Age of boys, 13 to 15. This kind of work has proved of great practical service to boys who have become connected with the building and furnishing trades. (2) *Pen and Ink Sketches*, a severer test than pencil drawing, as no marks can be rubbed out. The sketch of a cat's head was done by a boy of 13. (3) *Memory Maps* as exercises in freehand drawing, and also as tests of geographical knowledge. (4) *Leaves from Home Lesson Books*. Original designing, printing, and the use of colours, are encouraged to cultivate the taste. The printing preferred, being such as will be useful for labels and shop notices. (5) *Scientific Diagrams* as examples of drawing in light and shade, used to illustrate the work.

1414. RAMAGE, MRS. DAVID, 22 Gloucester Road, Kew.—A Genealogical Table of the Monarchs of England.

1415. WOODING, W., City of London School.—An improved Abacus.

1417. CORSAN, J. R., The London Sand Blast Decorative Glass Works, 80 Gray's Inn Road, London, W.C.—Permanent Tablets, being texts and mottoes suitable for schools, hospitals, &c., &c., engraved by the sand-blast process. *Method*—The glass is cut or engraved by a stream of sand ejected by steam power at considerable velocity, each grain of sand removing a particle of glass. The parts not required to be cut are protected by a gelatinous composition. These transparencies are seen to best advantage when hung inside windows, and are specially suited to impress upon the mind the subject matter displayed, forming as they do so complete a contrast to the usual surroundings of schools, &c. Being a mechanical production, the cost is comparatively small. For prices and further particulars apply as above.

1418. THE MUSICAL REFORM PRINTING AND PUBLISHING CO., 74 Fann Street, E.C.—The difficulty of learning to play pianoforte or organ music has been acknowledged by teachers and professors of music, and is likewise admitted by all who have studied the subject. The New Notation advocated by the Musical Reform Association, while adopting the present signs in use, and also the writing of music upon a five line stave, yet proceeds upon a different method of expressing the twelve sounds contained in the octave. The root difference between the old and new methods being as follows, whereas in the old notation but seven out of the twelve sounds contained in the octave are naturally provided for by the stave, the others being indicated by signs \flat and \sharp . In contra-distinction to this the new stave provides for each one of the sounds contained in the octave, therefore signs \flat and \sharp are not required; further the black notes of the pianoforte being expressed by the lines of the stave, and the white notes by the white spaces, the teaching of music is made comparatively easy.

For singing and harmony the new stave offers marked advantages over the old system.

The Exhibit consists, 1st, of songs engraved upon the new stave; 2nd, A series of lessons for children arranged according to and based upon the new method; 3rd, Wall charts for teaching

the theory of singing, harmony, and pianoforte playing in class; 4th, The " Magazine of Music," a journal devoted to the promulgating of the new method; in this will be found examples of music in both notations, also articles and musical compositions by authors of repute. Forthcoming numbers will contain lessons upon harmony according to both the old and new systems of notation.

1420. DUNHAM, ROBERT CLARK, 55 Cardington Street, Euston Square, N.W.—Dunham on Decimals.

1421. ALLMAN & SON, 67 New Oxford Street, W.C.—(1) *Models and Appliances for Teaching Writing.* Allman's New Code Copybooks, as exhibited, will be found upon examination to have been prepared in the most careful manner; but the system upon which the series has been based, that of a perfect gradation from the earliest lessons renders the best results certain, as will be seen by inspecting any of the fully filled up copy books which will be found in this exhibit, the writing of some of the boys, the younger ones in particular being admirable, that by Yexley (under 13 years of age), one of the Prize Winners at the Warehousemen and Clerks Schools, being almost equal to copper-plate.

(2) *Text Books.*—Attention is directed to the annotated series of extracts from standard authors, such as Gray's Elegy, Longfellow's Evangeline, Macaulay's Armada, &c., &c.; in addition to these and many other valuable books for elementary schools, there will be found carefully prepared reading books lately produced, notably the Geographical Series by Higman and the National Thrift Reader by Mrs. Lankester, which last publication embodies the most useful lessons of thrift, cleanliness, and health, placed before the reader in a style at once instructive and chatty.

1423. SONNENSCHEIN, A.—Apparatus for teaching Arithmetical Notation.

1424. DUPLOYÉ, ÉMILE, 23 Quai de l'Horloge, Paris.—Shorthand Method. Sloan Duployé books of English adaptation from above system.

1425. PITMAN, ISAAC, Bath.—(1) Phonetic Shorthand instruction, exercise, and reading books, printed in Shorthand characters; Chart of the Shorthand Alphabet; specimens of Shorthand; volumes of Standard Works in Shorthand; the weekly Phonetic Journal. Phonography, or Phonetic Shorthand is a system of Shorthand in which words are written phonetically, or by sound, and not according to the customary spelling of the language. Each sound of the language is provided with a separate sign, and each sign represents only one sound, consequently, when these signs are written, and a word composed of them is presented to the eye, it is as easily recognised as if it had been spoken. The system is suited to either correspondence or reporting, and readily adapts itself to foreign languages. (2) First, Second, Third, Fourth, and Fifth Books in Phonetic Reading. Several volumes printed in Phonetic Spelling.

1426. PITMAN, FREDERICK, 20 & 21 Paternoster Row, E.C.—(1) Shorthand Graduated Text Books, Diagrams, and various works entirely in shorthand, appliances, &c. (2) Music: Text Books for the piano, harmonium and other instruments.

1427. MATTAN, ALBERT O., Sorel, Province of Quebec, Canada.—Specimens of Penmanship.

1428. BEMROSE & SONS, 23 Old Bailey, E.C.—Writing Charts: A substitute for the blackboard, designed for class teaching in Infants' Schools and the First Standard; lithographed in white on a black ground, and mounted on stout boards, 32 by 22 inches, eyeletted and strung. A series of seven charts. Code Copy Books, arranged to meet all the requirements of writing in the New Code. Both the sloping and upright styles are introduced into the books for all Standards. Thirty books, twopence each. Picture Spelling Cards for infants. Suitable for the nursery wall and for Object Lessons in Infants' Schools. Adapted to Standard I., mounted on stout boards, measuring 28 by 22 inches, eyeletted and corded for hanging up. Printed in colours. A series of four cards.

1429. CASSIELL & COMPANY, Limited, La Belle Sauvage Yard, Ludgate Hill, E.C.—Various works on Health, including the "Book of Health," by eminent physicians and surgeons. "Our Homes, and how to make them Healthy," by leading sanitary authorities. "The Family Physician," by physicians and surgeons in the principal London hospitals. "The Handbook of Nursing," "The Ladies' Physician," "Manuals for Students of Medicine," by leading teachers in the principal medical schools, containing all the information required for medical examinations of the various colleges, halls, and universities in the United Kingdom and the Colonies. Works on Cookery and Domestic Economy, including "Cassell's Dictionary of Cookery," "Cassell's Domestic Dictionary," "Cassell's Household Guide," "A Year's Cookery," "Choice Dishes at small cost," &c. Recreative Science and Amusement: "Coloured Illustrations from Familiar Garden Flowers," "Familiar Wild Flowers," "Cassell's Popular

Gardening," "Canaries and Cage Birds," &c., "Cassell's Book of Sports and Pastimes," "Transformations of Insects," "The World of the Sea," &c. Natural History, &c.: "Cassell's Popular Natural History," "Animal Life Described and Illustrated," "Wild Animals and Birds." Popular Science: "Science for All," "World of Wonders," &c. Education: (1) Elementary School Books, Cassell's Modern School Series, including Modern School Readers, Historical Readers, Geographical Readers, Arithmetics, Graduated Copy Books, &c. (2) Drawing and Water Colour Painting: including Cassell's Popular "How to Draw" series, Freehand Drawing Copies, Flower Painting in Water Colours, Figure Painting in Water Colours, Water Colour Painting, Sepia Painting, &c. Technical Education: Manual of Technology, edited by Prof. Ayrton, F.R.S., and Richard Wormell, D.D., M.A. "Cassell's Technical Educator," "Cassell's Technical Manuals," "The Practical Dictionary of Mechanics," &c. Cyclopedias, &c.: "The Encyclopedic Dictionary," "The Dictionary of Mechanics," "Cassell's Concise Cyclopaedia," &c., and various other Educational and Students' Manuals.

1430. MARTIN, W., & CO., 67 Nile Street, Glasgow.—Solid Alto-Relievo Models, or Raised Maps of Continents and Countries, for instruction in geography and physiography; of strong and durable make for school wear, hard and tough in material. The following are now published:—

- (1) Europe, Asia, Africa, N. America, S. America, Oceania; size, framed, 22½ by 18½ in.
- (2) Europe, in Seven Sections; average size of framed sections, 11½ by 10 in.
- (3) Italy and the Alps, a superb and artistic model, in which is included the Rhone Valley, Switzerland, &c., size, framed, 22½ by 20½ in.
- (4) Sicily, interesting and instructive, on account of the enlarged representation of the volcanic mountain, Etna; size, framed, 22½ by 18½ in.
- (5) The Alto-Relievo mode of teaching geography, now widely adopted, is found the most effective. The youngest scholar, on seeing the world modelled in its real aspects, is interested, and, with ease and rapidity, forms true notions of the earth from these reproductions of its surface in actual elevation and depression. Being carefully constructed to altimetric and planimetric scales, the leading facts of physical geography are presented visibly and palpably to the pupil. Moreover, the 7 sections of Europe being modelled to the same scale, the relative extent and altitudes of the several countries are realized at sight: to look is to learn. The oral instructions of the teacher, and the descriptive letterpress of Geographical primers, are embodied and presented in these models at a glance: the mimic mountains and mountain chains, peaks, passes, slopes of land, basins drained by rivers, the line of perpetual snow, the raised land and the smooth ocean, all combining to put the scholar in possession of the true geography at sight.

1431. MATTHEWS, W. R., Board Schools, Chiswick.—Specimen of the black board map used in the Chiswick Board Schools. The lines of latitude and longitude are cut into the substance of the board in order to render them permanent, and thereby the restoration of the outline, should it become erased by use, a matter of extreme simplicity. It is found that the chalk used upon the board, during its employment for the purpose of illustrating any lesson in which geographical questions occur, is sufficient to keep these lines perfectly distinct without rendering them obtrusive. The physical features may be painted in as shown in the left-hand portion of this exhibit, or—which is by far preferable in the hands of an experienced teacher—the whole may be left blank, as shown in the right-hand portion, to be filled in with chalk either by him or by the children as the lesson proceeds. The use of these maps has tended to make geographical lessons exercise the intelligence and memories of the children, and to prevent the confusion usually created in their minds by a multitude of names printed in all kinds of type at every conceivable angle with each other. As an aid to class map drawing they have been found almost invaluable.

1432. LEAKE, J. W., Teacher at Bowman's Place Board School, Holloway, London.—Geographical Object-Teaching Charts. These charts contain matter which cannot be taught from maps, e.g. statistics, facts relating to climate and surface, wild animals; animal, vegetable, and mineral products; manufactures, imports, exports, trade with England; coinage and English equivalents; types of the various peoples in each country; costumes, &c. The colonial charts contain, in addition to the above, price of provisions and clothing, rates of wages, and cost of passage. Last year the boys of this school made cards, showing the productions and exports of the British isles and the colonies, for their home-lessons. The work was voluntary on their part, and they were enthusiastic over it.

1433. STANFORD, EDWARD, 55 Charing Cross, London, S.W.—(1) Stanford's Large Series of Wall Maps. (2) Physical Series of Wall Maps. (3) Extra Large Series, two maps as specimens. (4) Geological and Stereographical Maps of the British Isles. (5) Library Map of London, coloured according to School Boards. (6) Specimens of the Intermediate, Smaller, and Outline Series of School Maps, Natural History Diagrams, &c., &c.

1434. **GRIFFITH & FARRAN**, Educational Publishers, St. Paul's Church-yard, London.—Exhibit Reading Books for public Elementary Schools, Standard Authors Readers, Blakiston's Geographical Readers, Oscar Browning's Historical Readers, Darnell's Copy Books, Arithmetical and Algebraical Manuals, Exercises on English, Manuals and Appliances for simultaneous class teaching of needlework, Household Handbooks on Hygiene, &c., Books for Prizes and Rewards in Sunday and Day Schools.

1435. **SHELMERDINE, J.**, Raunds National School.—Map of England and Wales designed in relief. The object of the design is to aid teachers in the instruction of the younger children in Elementary Schools. The principle of the design is to represent nature in miniature rather than by picture or plan.

1436. **GEORGE GILL & SONS**, 23 Warwick Lane, Paternoster Row, E.C.—This exhibit is entirely confined to Educational Works used in the Elementary and Middle Class Schools of the country. They are as follows:—(1) In Elementary Schools. Works on every subject of the Education Code, arranged in Standards and otherwise. (2) In Middle Class Schools. These are specially prepared as useful handbooks for pupils preparing for the Oxford and Cambridge Local, the Society of Arts, and other Examinations. (3) In Schools of Art, and Drawing Classes in connection with the Science and Art Department. These have been specially written and designed for pupils preparing for the annual examinations in Freehand, Practical Geometry, Model, and Linear Perspective, in both the 1st and 2nd Grades. Numerous manuals.

1437. **HUGHES, JOSEPH**, 4 Pilgrim Street, Ludgate Hill, E.C.—Educational Publications.

1438. **SOCIETY FOR PROMOTING THE KNOWLEDGE OF FOREIGN LANGUAGES (THE)**, (Wholesale Warehouse, 13 Paternoster Row, E.C.), have issued a series of volumes, also issued in parts, which by a new and much approved method, introduced by Mr. C. Hossfeld, enable learners readily to acquire, either by self-instruction or in class, a thorough knowledge of either French, German, Spanish, or Italian. Fourteen Progressive Numbers are prepared for each language, containing a Complete Grammar, Exercises, Vocabulary, and Key; a Hundred Pages of Dialogues on every subject: a Complete Reader, with Notes to assist in translation; Instructions on Commercial Correspondence.

COLLINS, WILLIAM, SONS & CO., Limited, Glasgow. (See Class 51.)

EDWARDS, H. & G., 84 High Street, Camden Street, N.W. (See Class 47.)

MILLER, S. A., Orange House, College Park, Lewisham, S.E. (See Class 47.)

CLASS XLIX.

(*Royal Albert Hall.*)

Domestic Economy and other Forms of Technical and Industrial Education for Girls.—(a) Models and Apparatus for the teaching of Cookery, House-work, Washing and Ironing, Needlework and Embroidery, Dressmaking, Artificial Flower-making, Painting on Silk, Pottery, &c.; (b) Specimens of School Work.

1443. **WILSON, CHARLES, & SONS**, Carlton Work, Leeds.—The Gas Kitchener shown by this firm was invented by them for the Leeds Board Schools, and has since been adopted by Birmingham, Sheffield, Bradford, Batley, and Blackburn School Boards for teaching cookery in their schools. The Kitchener comprises two baking ovens, with boiling burners on the top; between the ovens is a gas fire, which possesses all the advantages both in appearance and use of an open coal fire, and can be used for roasting, grilling, &c. The whole is mounted on a platform on castors, so that it can be moved to any part of a class or lecture-room. The Kitchener is ready for use a few minutes after lighting, without any trouble. The cost of gas is less than coal. After the lessons, the stove is run into a cupboard, as shown in Mrs. C. M. Buckton's book on "Food and Cookery." Thermometers can be fitted to oven-doors.

1444. **SCHILD, MARIE**, 10 Southampton Street, Strand, London, W.C.—*Teaching Children to make their own Dolls' Clothing.*—To encourage children in the exercise of their needle, and also to give them some knowledge of the art of dress cutting and making up, Madame Schild has issued a series of four distinct sets of patterns for dolls' clothing, representing dolly as a baby, girl, young lady, and lady. Each series consists of the patterns of dress and underclothing complete, in an envelope, accompanied by a book describing and illustrating each toilette. In order to ensure correctness, and give children a more thorough

knowledge, each garment is cut in different coloured paper, and diagrams of each piece of the various garments are given, arranged in the proper order of joining, so that each series, or the whole, will form an instructive and amusing present. If while giving children presents of dolls, you can also buy with them patterns of the dresses and underclothing cut to fit that doll, it would considerably enhance the value of the present to the child, and make her desirous to begin at once to cut out and make them up, thus teaching her in play an accomplishment, viz. the proper manner to cut out and make up her own dresses, which may be most useful to her in womanhood.

1447. SCHOOL OF COOKERY AND DOMESTIC ECONOMY, 6, Shandwick Place, Edinburgh (MISS GUTHRIE WRIGHT, Hon. Sec.)—Apparatus used for instruction in Cookery and Domestic Economy, and Examples of School Work.

BRADFORD, T., & CO., 140-143 High Holborn, W.C. (See *Machinery in Motion, Western Gallery*.)

GRIFFITH & FARRAN, St. Paul's Churchyard, E.C. (See *Class 48.*)

MYERS, A. N., & CO., 15 Berners Street, Oxford Street, W. (See *Class 48.*)

SCIENTIFIC DRESS - CUTTING ASSOCIATION (THE), 272 Regent Street, W. (See *Western Gallery, Outside.*)

CLASS L.

Handicraft Teaching in Schools for Boys.—(a) Apparatus and Fittings for Elementary Trade Teaching in Schools; (b) Specimens of School Work.—(See *Central Institution of the City and Guilds of London.*)

CLASS LJ.

(*Royal Albert Hall.*)

Science Teaching.—(a) Apparatus and Models for Elementary Science Instruction in Schools; Apparatus for Chemistry, Physics, Mechanics, &c.; (b) Diagrams, Copies, Text-books, &c.; (c) Specimens of the School Work in these subjects.

1449. ORME, J., & CO., Manufacturers and Importers of Scientific Apparatus and Chemicals, 65 Barbican, London, E.C.—This exhibit comprises a selection of the apparatus approved by the Science and Art Department, for teaching chemistry, electricity, acoustics, light and heat; and towards the purchase of which Government aid is granted to the extent of 50 per cent. The chemical apparatus includes Hofmann's tubes, thermometers, flasks and retorts, of the finest Bohemian glass, retort stands, blowpipes, and a 20s. set of apparatus as supplied to the students at Bartholomew's Hospital Laboratory. Also pocket aneroid barometers. The electrical apparatus includes plate machines, magneto machines, batteries, Ruhmkorff's coils, vacuum tubes, &c. A Tate's air pump and a variety of apparatus for pneumatic and acoustic experiments to illustrate those sciences; and for heat and light a Ferguson's pyrometer, Gravesand's ring and ball, cryophorus, Daniel's hygrometers, glass mirrors, prisms, and a Newton's disc for the lantern. A special feature in the exhibit is a series of glass bottles for acids, &c., having labels ground out of the glass by the sand-blast process. These labels are imperishable, and the cost of the bottles is much lower than that of the enamelled label, bottles generally in use.

1450. GRIFFIN, JOHN JOSEPH, & SONS, 22 Garrick Street, Covent Garden, London, W.C.—Apparatus for the practical illustration of Twining's "Science Made Easy," course of 10 lectures, comprising the following subjects:—Mechanical Physics; Chemical Physics; Inorganic Chemistry; Organic Chemistry; Botany; Zoology; Human Anatomy and Physiology. Apparatus for Elementary Science Instruction in the following subjects:—Acoustics; Light; Heat; Electricity; Magnetism and Galvanism, comprising:—Acoustics, Savart's Apparatus; Boyle's Tube; Siren. Light, Mirrors; Spectroscope; Prisms; Lenses; Reflection Apparatus. Heat, Contraction Apparatus; Gravesand's Pyrometer; Daniell's Pyrometer; Mason's Hygrometer; Six' Thermometer. Electricity, Henley's Discharger; Electric Pendulum; Sir W. Thompson's Electrometer; Coulomb's Torsion Electrometer; Electrophorus; Henley's Pith Ball Electrometer; Epinus Condenser; Aurora Globe Electroscope. Magnetism and Galvanism, Grove's Battery, Galvanometers; Induction Coils; Ampère's Stand; Bichromate Batteries; Electro-Magnets; Dipping Needles; Vacuum Tubes; Electro-Magnetic Engine; Electric Lamp and Lantern; Electric Bells. Various, Tate's Air Pump; Baroscope; Leslie's Apparatus for Freezing Water; Barker's Mill; Tantilus Cup; Lift and Force Pumps; Archimedean Screw.

1451. CIETTI, E., 36 Brooke Street, Holborn.—Apparatus for Science Instruction. Philosophical Instruments.

1452. HARVEY & PEAK, Beak Street, Regent Street, W.—Heat, Light, Acoustic Electrical Test and Various Apparatus, including Thermopile, Galvanometers, Prisms, Syrens, Monochord, Organ Pipe, Electro Magnet, Resistance Coils, Bridge, Rheostat, Keys, Commutator, Nautical Projector, Maxwell's Dynamical and Colour Tops, &c.

1453. NEWMANN, O., & CO., 40 Cheapside, E.C.; 7 Trafalgar Buildings, Charing Cross, W.C.; & at Berlin.—Apparatus and Instruments for teaching science dynamics, dynamics, acoustics, mechanics, natural history, geometry, and agricultural science. Collections of Apparatus and Instruments for elementary schools, technical schools, and universities. (1) Dynamo-Electric Machine, with handle movement. Supplies a current sufficient for all experiments to be made in schools and in the laboratory; has the effect of nearly 20 Bunsen elements. (2) Concussion Apparatus, to illustrate the action of rebounding bodies. (3) Parallelogram of forces, illustrating the division of force. (4) Greatly improved inclined plane, adjustable, with very little friction. Also other apparatus for illustrating and investigating the laws of heat and light, hydrostatics, hydraulics, capillary attraction, &c. (5) Among electrical appliances is exhibited a new electric magnetic inclinatorium, with which the following experiments may be most clearly demonstrated to a great circle of pupils: (a) The attraction of iron by a magnet; (b) Repulsion of magnetic poles of the same name and attraction of unequal ones; (c) The phenomenon of declination; (d) The magnetic action of the terrestrial globe upon soft iron, and many other laws.

Geometry.—Collection of geometrical bodies (hollow), made of metal, which may be filled with sand or water, and so some of the most perplexing geometrical axioms may be demonstrated in the clearest manner, so that even the least intelligent pupil will be able to grasp it. Set comprises 34 bodies.

Agricultural Science.—Dissectible Models, illustrating the various ways of grafting. Model 1 illustrates grafting shown on an apple-tree; 2, grafting by the side on a pear-tree; 3, grafting in a slit made on an apple-tree; 4, grafting in the bark on an apple-tree; 5, inoculation (*aougein*) illustrated by a pear model.

Natural History.—(1) Metamorphoses of insects. (2) In two glass vases, the various shaped feet of birds, according to their classification.

1454. JOHN COTRELL, 21 Albemarle Street, W.—Apparatus for experimentally illustrating Professor Tyndall's "Lessons in Electricity." The apparatus is cheaply but efficiently constructed, for use in schools, for science teachers, and private students. It is identical with the apparatus used by Professor Tyndall, in a course of six Lectures delivered before a Juvenile Auditory at the Royal Institution of Great Britain. By its means, and the use of Professor Tyndall's "Lessons," a course of instruction in Elementary Electricity can be experimentally demonstrated.

1455. BECK, R. & J., 68 Cornhill, E.C.—(1) Microscopes, School Microscopes, Students' Microscopes, Microscopes specially made for the investigation of Bacteria, Petrological Microscopes, Dissecting Microscopes. (2) Microscopic Apparatus, New Achromatic high-angled condensers, with special diaphragm arrangements for modifying and controlling the light. (3) Staining Fluids, for demonstrating bacteria, including Dr. H. Gibbes' double stain for the tubercle bacillus, New Purple Stain, Methyl Blue, Gentian Violet. (4) Microtomes, New Ether Spray Freezing Microtome, in which the ether fumes are conveyed away, thus getting rid of smell, and in which the minimum amount of ether is used. (5) New Lamp, with Herschel condenser and delicate adjustments for changing the position and character of the light. (6) All requisites for preparing pathological, physiological, and other kinds of microscopic objects. (7) Specimens of Bacteria and pathological objects. (8) Lenses and prism used in the manufacture of optical instruments.

1456. FROST, A. J., 6 Westminster Chambers, Victoria Street, S.W.—(1) Clark's Improved Transit Instruments, 18-in. and 18-in. (2) Clark's Window Transit Instrument. (3) Clark's Treatise on the Transit Instrument as used for obtaining time. (4) Clark's Manual of Transit Instrument as used for obtaining time. (5) Clark's Annual Transit Tables.

The science of astronomy as a branch of education has been hitherto strangely neglected,—admittedly the most noble of sciences, it is calculated beyond all others to enlarge the mind, and to give the student artisan or manufacturer the truest and grandest ideas of magnitude, order and precision.

The Transit Instrument is the most important instrument used by astronomers for obtaining time, and is practically the source of our time throughout the world. Its use has been hitherto confined almost exclusively to astronomers, in consequence chiefly of its high cost and the necessity of making somewhat troublesome calculations from the Nautical Almanac for each observation.

The exhibitor has, in conjunction with others, made strenuous endeavours for some years past to popularise the use of the Transit instrument.

1. By improving the construction of the instrument and reducing its cost. 2. By publishing a treatise on the Transit Instrument with numerous tables, also a popular Shilling "Manual" on the subject. 3. By publishing annually a series of "Transit Tables," containing the daily transits of the stars in ordinary Greenwich time, with instructions for use throughout the world.

The instruments exhibited are—

1. The 13-in. and the 18-in. Transit Instrument, with apertures of 1½-in. and 1¾-in. respectively; the improvements consist in the general design, in the novel mode of attaching the instrument to its base so as to avoid flexure, in the vernier arm which permits the instrument to be adjusted indoors, and merely laid in its stand when used, and in the firmness with which it remains fixed in position while observing. In these instruments the use of the small secondary level becomes unnecessary. The cost of the instrument is reduced to about one-third of its ordinary cost, and this has been effected without any sacrifice of accuracy, while the quality of the workmanship speaks for itself. 2. The "Window Transit." This is an entirely novel form of instrument, of great strength and compactness. It is a most convenient form for ordinary use and is also specially adapted for fixing on a window sill; its cost is even less than that of the ordinary forms. 3. Meridian marks of a highly improved quality. 4. A "Treatise on the Transit Instrument as applied to the determination of time." This is the first complete treatise on the subject published, and contains a variety of tables, many of which are believed to be of great utility and entirely new in character. 5. A popular "Manual of the Transit Instrument," containing in the simplest form all the instruction necessary for fixing and using the instrument. 6. "Transit Tables" (published annually), giving the time of transit of about 25 stars and planets for every day in the year, with instructions for use. These tables are suited for all parts of the globe, and are so arranged that no calculation of any kind is required.

Apart from its utility for the purpose of obtaining time, the practical manipulation of the Transit Instrument forms the very best introduction to the science of astronomy, and its educational merits are so great that its use ought to be generally taught in all science schools and technical institutions throughout the kingdom.

1457. BAPTY, S. LEE, 65 Blackheath Road, Greenwich.—(1) Photographic Enlargements of Microscopic Objects, illustrating the physiology of plants and animals, comprising an assortment of wood sections, transverse, radial, and axial (especially prepared for purposes of comparison), stem and leaf sections, insects, and portions of insects, &c. (2) Transparencies of the above, suitable for use with the optical lantern.

1458. ATKINSON, LEO, 121 Greenwich Road, Greenwich, S.E.—Photo-Micrographs, on a scale suitable for illustrating physiology, botany, zoology, enabling teachers to show structural detail to entire classes which could only otherwise be shown separately in the microscope. Any subject can be reproduced as a transparency for projection with the optical lantern, and demonstrators can have their own subjects or sections photographed to meet their special requirements.

1459. SWIFT & SONS, 81 Tottenham Court Road, W.—(1) Swift and Son's Histological Microscopes. (2) University Monocular Microscope, with Objectives, in case. (3) University Binocular Microscope, with Objectives, in case. (4) Challenge Binocular Microscope, with Objectives in Cabinet. (5) Popular Achromatic Condenser, with Combination Spot Lens and Polariscopic. (6) Achromatic Condenser, a perfect substitute for all under stage illuminating apparatus. (7) Ice Freezing Microtome, for class work. (8) Ice Freezing Microtome, new patented form, employing ether.

1460. HOBY, J. CHARLES J., 29 South Street, Thurloe Square.—(1) Cabinet of three Trays, containing rocks, fossils, &c. (2) Box, small collection of minerals.

1461. RUSSELL, THOMAS D., 78 Newgate Street, E.C.—(1) Collections to illustrate Dr. Geikie's Science Premier of Geology, and the First Book of Geology by Dr. Davis. (2) Collections of Typical Rocks and Typical Rock Sections.

1462. GREGORY, JAMES R., 88 Charlotte Street, Fitzroy Square, W.—Geological Collections illustrating elementary treatises on the subject, such as Professor Geikie's Geology Primer and other manuals. Mineral collections to illustrate Dana's Mineralogy and Mr. Rutley's small manual; these contain examples of most of the minerals employed in the arts and manufactures, as well as the chief metallic ores. Petrology is especially illustrated by collections to use with Rutley's "The Study of the Rock." Microscopic sections of

rocks, very carefully sliced, and so thin as to be transparent in order that by means of the microscope and other optical appliances, the mineral constituents of the rocks may be identified. Elementary Collections of Fossils illustrating Palaeontology. Fossils are partly included in the geological collections, together with rock specimens, and minerals, as exhibiting the chief materials forming the crust of the earth.

1464. TOWNSON & MERCER, 89 Bishopsgate Street Within.—Apparatus for Scientific Instruction in Schools.

1465. GEORGE CUSSONS, Cheetham Hill, Manchester.—Whilst the subject of descriptive Geometry is the basis of mechanical and architectural drawing, it is directly useful in many of the trades and professions, as Joinery and Carpentry, Tin-plate Work, Boiler Making, Mechanical Engineering, Military Engineering.

The apparatus is designed to teach and illustrate the science of descriptive geometry, as taught in the Military, and Science and Art Schools.

A knowledge of the subject depends less upon information and formula derived from technical books, than upon a proper conception of the actual conditions of the problem.

If the student comprehends clearly what is required, and can also conceive the existence of lines and surfaces in space, and their relations to certain fixed planes, he may then be able to give correct solutions based upon his own reasoning.

The apparatus shows the relations of planes, lines, projections, traces, &c., as they actually exist with respect to two co-ordinate planes.

Each model can be closed up neatly when out of use to about the size of a small drawing board.

The minor model is designed to show to a class the elevation and plan of an object, and also the effect produced upon the elevation by an alteration of ground line.

The teacher may also check the students' work by reference to the picture of the elevation in the minor.

A number of useful models of form are supplied with the apparatus, also a universal support to hold them.

1466. COLLINS, WILLIAM, SONS, & CO., Limited, Glasgow.—(1) Science Text Books: Elementary subjects, 1 to 25; Advanced Subjects, 1 to 22; Diagrams. (2) Science and Art Text Books: Drawing Books, Freehand, Advanced. Practical Geometry; Drawing to scale; Test Examination Papers and Cards.

1467. CHARLES THOMAS MILLIS (Evening Lecturer on Practical Geometry and Metal Plate Work at the Technical College, Finsbury), 4, Northumberland Terrace, Regent's Park Road, N.W.—Models illustrating Projective Geometry.—(1) Central Projection. (2) Conics as Projections of Circles. (3) Parallel Projection. (4) Orthographic Projection. (5) Penetration and Wire Skeleton Models of Solids. Diagrams.

PROJECTIVE GEOMETRY.—These models are made to illustrate the projection of plane figures from one plane to another, the projecting rays starting from one point called the *centre of projection*. The line in which the two planes meet is called the *axis of projection*. Out of this general case special cases arise if either the axis or the centre be moved to an infinite distance. In the first case the two planes become parallel and the figures will be similar. In the second case the projecting rays become parallel, and the projection is called parallel projection. If in this case (see Model 1, 2, and 3) the rays are perpendicular to the plane to which the figure is projected, the projection is called orthographic, which is the one used in mechanical and engineering drawing. Both the plan and the elevation in these drawings are orthographic projections. The models illustrate the various kinds of projection mentioned, and may be divided into three groups.

GROUP 1.—Central projection general case. Model 1 A shows that the points in lines which are projected to infinity, lie in the line which is projected to infinity. 2 A, 3 A, and 4 A; these models show that the projections of circles are curves of order 2 and class 2 (conics), because all lines cutting the circles in two points are projected into lines which cut the projections of the circles in two points; and the tangents drawn from points to the circles are projected into tangents to the curves which are the projections of the circles. In the case of the circle (3 A), the tangents at the points of contact of intersection of the circle and line projected to infinity, are projected to tangents to the curve (hyperbola), whose points of contact are projected to infinity. Hence they become the asymptotes to the hyperbola. The models also show that the projections of circles are either parabolas, hyperbolas, or ellipses, according as they have one, two, or no points in common with the line which is projected to infinity. Model 5 A illustrates "Desargue's" Theorem:—"If the lines joining corresponding vertices in two triangles are concurrent (meet in a point), then the intersection of corresponding sides are collinear (three points in a line)." Model 6 A shows that figures projected from a point in parallel planes (*axis at infinity*) are similar figures.

Chapter 2 Parallel projection. ~ 7 A model shows the projection of a circle by parallel rays (center at infinity).

CHAPTER III. *Orthographic projection.* - Model No. 1 consists of moveable planes, showing a cube on an inclined plane, and method of placing a line on a plane. No. (2) is a model with moveable planes and a wire model showing the lines used to find the dihedral angle between. The semi-cone serves to show a method for finding the inclination of a plane to the horizontal or vertical planes. (No. 3) shows how to find the plane containing two intersecting lines given by their inclinations; also a moveable auxiliary plane. No. 4 is a moveable model of the co-ordinate planes, with two inclined planes, &c. Wire models of solids and penetration models useful for art purposes as well as projection. Diagrams of problems in projective geometry of which the models are illustrations.

140. OOMPIERDORF, PAUL, Fabricant von Botanischen und Zoologischen Modellen, Amsterdam. Models of Plant Parasites.

140. BROGAN, FREDERICK YORKE, 4 Mill Street, Hanover Square, W.
(1) Plants, dried and mounted. (2) Seeds and Nuts. (3) Portfolios and Books of Illustrations. (4) Apparatus for collecting, &c.

147/148 MITSUBISHI, J. Gitschinor Strasse, 109 Berlin.—Astronomical and other
Mitsubishi

1471. WHOLANGTON, J. A. 33 Howley place, Maida Hill.—Astronomical Chart of the Universe, prepared by M. Laporte.

1476. **ORM WOOD, R. A.**, Dunster Lodge, Spring Grove, Isleworth.—The Diagrams of the Royal Agricultural Society and the "Manual and Guide" have been issued as an endeavour to place some amount of information on the important subject of preventing insect damage to the crops, in such a form as, by plentiful illustration and plain English wording, would make the information clear for common farm use. The result has shown that by thus making the subject in some degree accessible to those who have no leisure for abstruse study, constantly increasing attention is being paid to it throughout the country; and the plan of sound, but at the same time simple and practical, instruction on the matter is now found to answer, when taken up as a part of regular school instruction in an agricultural district.

Mr. W. H. Brewster, of Scituate, Mass., writes: "A Collection of
American Birds, with Descriptions and Illustrations, and Present Knowledge
of Their Habits and Migrations." I am enclosing the most important

ries of maps of the world showing the physical features of the land, movements of the waters, distribution of the winds, rain, and climates, volcanic and earthquake regions. With descriptive notes. Size 60 x 60 ins. (3) *Geological Section of the Earth's Crust*.—A coloured diagram, exhibiting the various geological formations, their order, outcrops at the earth's surface, and other geological phenomena. Descriptive notes at foot of diagram. Size 72 x 20 ins. (4) *Coloured Diagrams of Machinery, Manufactures, &c.* The series consists of twenty-seven various diagrams, designed to illustrate in a comprehensive manner the principles and mode of action of each subject treated. Three are exhibited as specimens, viz. The Steam Engine, the Clock, and the Barometer. Descriptive notes at foot. Size 36 x 24 ins.

BATCHIELOR, H. & T., West Kensington, opposite West Kensington Station. (See *Machinery in Motion, Western Gallery*.)

GARCIET et NISIUS, 76 Rue de Rennes, Paris (Agents, **EMILE FOUCAUD & CO.**, 23 & 24 Hop Exchange, Southwark Street, S.E.) (See Class 48.)

HAMMER, GEORGE M. & CO., 370 Strand. (See Class 48.)

HUGHES, JOSEPH, 4 Pilgrim Street, Ludgate Hill, E.C. (See Class 48.)

MYERS, A. N., & CO., 15 Berners Street, Oxford Street, W. (See Class 48.)

NORTH OF ENGLAND SCHOOL FURNISHING CO., Limited (THE), Darlington. (See Class 48.)

SENNET, A. R., 62 Hatton Garden, E.C. (See Class 26.)

CLASS LII.

(*Royal Albert Hall*.)

Art Teaching.—(a) Apparatus, Models, and Fittings for Elementary Art Instruction in Schools; (b) Diagrams, Copies, Text-books, &c.; (c) Specimens of Art Work, Modelling, &c., in Schools.

1480. WOOD, GILBERT, 175 Strand, W.C.—A series of reproductions of works of art by eminent painters, architects, and decorators, published in the 'Architect Journal.'

1481. D. BRUCCIANI & CO., 10 Russell Street, London, W.C.—(1) Statues from the antique. (2) Busts from the antique. (3) Ornaments, Pilasters, Reliefs, &c., from the antique. (4) Renaissance and Gothic Fruit, Flowers, and leaves, cast from nature. (5) Hand and Feet from the antique and from nature. (6) Statuettes and Sections from the antique, supplied by appointment to the Government Schools of Art.

1482. ABLETT, T. R., 36 Wemyss Road, Blackheath, S.E.

CLASS TEACHING OF DRAWING IN SCHOOL.

(1) *Coloured Written Drawing*.—The kind of stroke hitherto used only in writing is employed in representing the forms of flat objects which are similar to the curves of letters, first in delineation of those objects, and afterwards in the formation of a running pattern. Common Objects (26, 38). Coloured Written Drawing (14, 32).

(2) *Judgment at Sight*.—Rods for length (58). Ruler, with slide, for proportion (55). Shutter, for comparison of vertical and horizontal distance (57). Disc, for angles (56). The rods, ruler and shutter are M. Pillet's invention.

(3) *Memory Drawing*.—Designed to sharpen the powers of observing and of remembering (48).

(4) *Dictated Drawing*.—Designed to ensure accuracy of nomenclature, and to facilitate the teaching of drawing to scale (67).

(5) *Model Drawing*.—The Glass Plane is used to show practically the difference between the real and apparent form of an object (35). In the course of study straight-lined objects are taken first, as the door (17). Afterwards the circles (24) and the ellipses (50) show the effect of foreshortening on simple curves, and then (34) used with (35) shows the foreshortening of simple curves on a flat surface. The boughs of trees (31, 33) afford good practice in foreshortening, and the large cast ostrich eggs, vegetable marrows and Spanish onions more difficult practice still. Class teaching of model 54.

(6) *Coloured Freehand*.—Colour, makes a copy interesting, intelligible, and easy to be seen. See the same outline coloured and uncoloured (11, 12). The connection between natural and conventional forms. Drawn by the members of a class of teachers engaged in studying methods of teaching (2, 3, 8, 10, 13, 65, 66). Shaded freehand, practice in laying a flat shade. Camel (59). Pressed leaves as freehand copies (21). Freehand copy made and coloured in twenty minutes (36). Class teaching of coloured freehand (58). Freehand copy drawn entirely with the brush (43).

(7) *Coloured Geometry*.—Interesting, and forms an introduction to coloured design and to the use of colour in making clear the different materials used in machine drawing and building construction (18).

(8) *Solid Geometry*.—The hinged black boards facilitate the explanation of its elementary principles (22, 52).

(9) *Shading*.—Set of Studies done in class in four hours, with teachers' class demonstration. Studies of students (41, 42, 68). Teachers' demonstration (40, 39). No. 29 executed by a boy of 16 after only 50 hours' practice. Class teaching of shading (19). The connection of shading with painting. The sepia is simply an exercise in manipulation after the shading is finished (27, 28).

(10) *Tone and Painting*.—Diagram to explain the meaning of tone (25). Studies of tone made from still-life groups, afterwards painted (30, 37, 46). Groups of objects to illustrate subtle and violent contrasts of tone. Great contrast (49). Subtle contrast in dark key (23). Subtle contrast in light key (51). *Groups of Water Colour*.—Three gold medals and two silver medals were obtained, in two years, in the National Competition of the Science and Art Department by students studying tone and painting as here illustrated. One student obtained the gold medal at the age of sixteen. His work was purchased by the Science and Art Department, and cannot be obtained for exhibition here.

(11) *Design*.—Worked in class on simple conditions, dictated by the teacher (44, 45).

(12) *Exercise of the Imagination*.—Illustrations drawn, without help from other illustrations or from a teacher, by a girl fourteen years of age (63).

1483. REEVES & SONS, 113 Cheapside, E.C.—Artists' Materials, for oil painting and water-colour drawing, as used by artists, amateurs, and in elementary instruction. Also all requisites for architects and engineers.

1484. CUSSONS, GEORGE, Cheetham Hill, Manchester.—Art Vases in wood (unbreakable) for drawing classes. These models are well adapted for ordinary use in elementary schools and art classes. They are carefully made out of dry selected hard wood. They are more durable and cheaper than the porcelain jars.

1485. STANDAGE, H. C., Keppel Street Studio, S.W.—(1) The Universal T Square, an instrument for the use of draughtsmen, which enables them to dispense with the employment of the ordinary T square. (2) Set Squares. (3) Parallel Ruler. (4) Protractor or Scale of Chords. (5) The Dividers and the Ordinary Measuring Rule.

1486. GUNSTON, WILLIAM, 30 Tollington Place, Tollington Park, N.—(1) Art Teaching, as applicable to schools. (2) Historical and other designs for frescoes, friezes, &c.

1487. CHAPMAN & HALL, 11 Henrietta Street.—Diagrams for Elementary Art Instruction as supplied to the Science and Art Department, South Kensington.

CHUBB & SONS' LOCK & SAFE CO., Limited, 128 Queen Victoria Street, E.C. (See Class 20.)

COALBROOKDALE CO., Limited (THE), Shropshire; & Holborn Viaduct. (See Class 21.)

COLLINS, WILLIAM, & CO., Limited, Glasgow. (See Class 51.)

GARCRET et NISIUS, 76 Rue de Rennes, Paris (Agent, EMILE FOUCARD, 23 & 24 Hop Exchange, Southwark Street, S.E.). (See Class 48.)

HAMMER, GEORGE M., & CO., 370 Strand. (See Class 48.)

MYERS, A. N., & CO., 15 Berners Street, Oxford Street, W. (See Class 48.)

NORTH OF ENGLAND SCHOOL FURNISHING CO., Limited (THE), Darlington. (See Class 48.)

CLASS LIII.

Technical and Apprenticeship Schools.—(a) Apparatus and Examples used in Primary and Secondary Schools for teaching Handicrafts; (b) Models, Plans, and Designs for the Fitting up of Workshop and Industrial Schools; (c) Results of Industrial Work done in such Schools.

(See Central Institution of the City and Guilds of London.)

CLASS LIV.

(Royal Albert Hall.)

Schools for the Blind and for the Deaf and Dumb.—(a) Apparatus and Examples for Teaching; (b) Specimens of School Work.

MYERS, A. N., & CO., 15 Berners Street, Oxford Street, W. (See Class 48.)

ROTH, DR. M., 48 Wimpole Street, Cavendish Square, W. (See Class 39.)

CLASS LV.

(Royal Albert Hall.)

Literature, Statistics and Diagrams relating to Group 6 and to the Effects of "Cramming" and Overwork on the Young, &c.

FOHRING, DR. H., President of the I. Criminal Laws of Hamburg.—Tract concerning the laws, plans, regulations and conditions of public and private schools for youthful offenders, and begging, wandering and destitute children of Hamburg, France, Belgium, Holland, Italy and Switzerland. (See Library.)

MILLER, S. A., Orange House, College Park, Lewisham, S.E.—(1) Some thoughts on Education. (2) Hints on Method, in Detail. (See Library.)

PICK, PROFESSOR ADOLFO, Giardino d'infanzia Rialto, Venice.—Five Volumes of Works on Education. (See Library.)

CLASS LVI.

(Royal Albert Hall.)

Collective Displays of School Work and Appliances. School Museums.

1488. SOCIETY FOR PROMOTING CHRISTIAN KNOWLEDGE.—The Society exhibits publications intended to familiarise the people with the laws of health. They comprise—(1) Popular Manuals, published at 1s. each, prepared by the late Professor Parkes, Professor de Chaumont, Dr. B. W. Richardson, Professor Noel Hartley, and Dr. Bernays. (2) Manuals on Thrift and Domestic Economy, by the Rev. W. Lewery Blackley and Dr. B. W. Richardson. (3) Diagrams to illustrate Elementary Physiology.

The following is a list of the Manuals exhibited:—*Manuals of Health*. A Set of Manuals for Household Use. Fcap. 8vo, limp cloth, 1s. each. "On Personal Care of Health;" by the late E. A. Parkes, M.D. "Food;" by Albert J. Bernays, Ph.D., F.C.S. "Water, Air, and Disinfectants;" by W. Noel Hartley, Esq., King's College. "Health and Occupation;" by B. W. Richardson, Esq., M.D., F.R.S. "The Habitation in Relation to Health;" by F. S. François de Chaumont, M.D., F.R.S. *The People's Library*. Crown 8vo, cloth boards, 1s. each. "Guild of Good Life (The), a Narrative of Domestic Health and Economy;" by B. W. Richardson, M.D., F.S.S. "Thrift and Independence, a Word for Working Men;" by the Rev. W. Lewery Blackley, M.A.

1489. RELIGIOUS TRACT SOCIETY, 56 Paternoster Row, E.C.—Books and Pictures for Schools, and Educational Books.

CLASS LVII.

(Royal Albert Hall.)

Machinery and Appliances relating to Group 6.

1492. WATERLOW & SONS, Limited, 25-27 Great Winchester Street.—(1) Stylographic Pens. (2) Pencils. (3) Anderson's Patent Copying Apparatus and various other Copying Processes. (4) Waterlow's Patent Autographic Press.

THE EDISON ELECTRIC PEN & WRITING AGENCY, 52 & 53 Great Tewer Street, E.C. (See Machinery in Motion, Western Gallery.)

CENTRAL INSTITUTION OF THE CITY AND GUILDS OF LONDON.

DIVISION II.—EDUCATION.

GROUP VI.—EDUCATIONAL WORKS AND APPLIANCES.

CLASS XLVII.

Crèches and Infant Schools.—(a) Apparatus and Fittings for Crèches and Infant Schools; (b) Games, Toys and Kindergarten Amusements; (c) Models and Appliances for Teaching; (d) Examples of School Work.

1500. THE BRITISH AND FOREIGN SCHOOL SOCIETY'S KINDERGARTEN EXHIBITION.—The "Kindergarten," or "Children's Garden," is the name given by Fröbel* to an institution, where, in fresh pure air, amid pleasant and beautiful objects, and under the care of an educated and loving woman, the child-nature may be gradually and harmoniously developed in its threefold relation to nature, man, and God, as a preparation for the education and discipline of the school. What a happy, well-ordered home, with all its quickening and developing influences is for the little ones of a refined and wealthy family, this the Kindergarten aims to be for those less fortunately circumstanced. Coming between the nursery (or the crèche) and the school, and providing interest, occupation, and cultivation for the children from three or four to six or seven, its object is to secure that inestimable blessing, a happy childhood. Its essential features, as shown or hinted at in this Exhibition, are bright and cheerful rooms, varied and suitable occupations, a trained teacher, and a right view of the individuality and possibilities of child-nature.

The outline of a room in which illustrated lessons and games will be given according to the following programme, may suffice to indicate the proportions which are most economical and convenient, and the furniture which is necessary. Several ground plans are exhibited on the outside of the screen, showing how the rooms may be grouped to make the most of site, aspect, &c. There should, if possible, be a room for each class, a central hall for the games, a garden with flower beds round the wall, and an open turfed or gravelled space for outdoor occupations and exercise. Each room should have as a minimum 100 cubic feet for each child. The light should fall from the left side or above. The walls should be so coloured as not to injure or weary the eyes. There should be a few pictures representing truthfully familiar animals, objects, and scenes. Plants and flowers should be used for decoration. To economise space the class room exhibited is also used for the games—the furniture being set aside and the piano, which should be in the hall, brought in.

PROGRAMME OF LESSONS AND GAMES.

June 14.—Sticklaying	..	Miss Pattison.	Aug. 9.—Mat-plaiting	..	Miss Palmer.
“ 21.—Gift IV.	..	Miss Pridham.	” 16.—Gift V.	..	Miss Pattison
“ 28.—Paper-cutting	..	Miss Nuth.	” 23.—		
	(easy course)		” 30.—		
July 5.—Drawing	..	Mme. Michaelis	Sept. 6.—		
“ 12.—Modelling	..		” 13.—Paper folding	..	Miss Reid.
	(blind children)		” 20.—Tablet-laying	..	Miss Pattison.
“ 19.—Modelling	..	Mrs. Green.	” 27.—Gift IV.	..	Miss Franks.
“ 26.—Pricking	..	Miss Wells.	Oct. 4.—Gift VI.	..	Miss Bolton.
Aug. 2.—Sewing	..	Miss Bolton.	” 11.—Painting	..	Mr. Cook.
			” 18.—Paper folding	..	Miss Franks.

DIAGRAM.—The diagram on the west wall will give a bird's-eye view of the Kindergarten system, showing the raw materials used for the occupations. These are simple and cheap, and therefore within reach of every child. They consist mainly of Wool, Wood, Paper, Clay, and

* Friderich Fröbel (born at Oberweissbach in 1782; died at Marienthal in 1852) finding by experience that no amount of effort or care afterwards could compensate for the waste or misdirection of the developing forces of a child's earlier years, devoted a large portion of his life to the elaboration of a system whereby, by a logical arrangement of occupations needing only simple and cheap material, and the free use of action-songs and gymnastic and imitative games, the various powers of body, mind, and heart may be successfully cultivated as a preparation for school-work. Fröbel was a pupil and disciple of Pestalozzi, and a student at the Universities of Göttingen and Berlin. Not only has his system been widely adopted in Germany, Switzerland, Italy, America, and England; its principles, and to some extent its methods have been incorporated in other systems; and, on the other hand, the name is used by many who have none of Fröbel's spirit, and only a caricature of his "Kindergarten" system.

Send. A two-fold arrangement of the materials is attempted, viz. (1) in concentric bands, according to the average age of the children for whom the occupations are suitable; and (2) from the left to the right of the diagram, indicating the order in which the occupations should come—then dealing solids first, planes next, lines third, points fourth, and shapeless material last. Underneath the occupations is specified what is intended to be taught. Besides the training of eye, hand (especially fingers), and mind, which is sought in the occupations, the Kindergarten aims at the cultivation of other parts of the child nature, by means which are mentioned in the lower part of the diagram. These, like the occupations, have their explanation and justification in the central principle which is thus stated.

The Kindergarten recognises each child as an individual with a threefold relationship to God, man, and nature, to be dealt with according to its own individuality, laying hold especially of its reverence, affection, curiosity, imitativeness, emulation, love of activity, desire for useful and tangible results in order to cultivate mental and moral qualities as well as to develop the limbs and organs of perception through communication and production.

On the outer rim of the diagram are the names of the qualities which it is the direct object of the Kindergarten training to develop.

The occupations may, with advantage, be carried on through and even beyond the school-life, though only shown as applicable to the Kindergarten proper (4 to 6) and the Transition class (6 to 7). They are *play* at first, and become *work* afterwards—hand-work and then head-work. Beginning with the concrete, the child makes his own discoveries by handling, counting, measuring, and transferring the material, invents his own designs, and thus gradually reaches a number of abstract ideas. He becomes familiar with things before he learns their names, thus making book learning easy and interesting when he comes to it, and laying the foundation of general intelligence.

In looking at the diagram it should be borne in mind that the principle is capable of almost indefinite application. The materials exhibited have been carefully chosen and arranged, in the belief that by their progressive use the development of the child may be most easily and surely accomplished. But mere occupation or desultory amusement with a set of toys or objects, however complete and well adapted, is not Kindergarten training. And, on the other hand, true teachers may invent new methods and apply the principle in new and original ways.

EXHIBITS.—The exhibits round the room (contributed by various teachers, and some the work of individual children, while others are the combined result of class-work) are arranged to show:—

I. The progressive nature of the exercises prescribed, e.g. the *Sewing-on Card*, the *Map-plaiting*, and the *Drawing*, in each of which series the gradations are clearly exhibited.

II. The way in which the various occupations may be made to prepare for and lead on to some of the items of school-work, such as Knowledge of the Alphabet, the Elementary operations of Arithmetic, Elementary Geometry, Natural History, History and Geography, Drawing, Design, and Needlework. And

III. The way in which even children may produce, at a nominal cost and as the result of pleasant use of spare time, objects of symmetry and beauty for the decoration of their homes or for presents to their friends,—thus encouraging industry, quickening the love of what is beautiful, improving the taste, promoting friendly expressions of interest and regard, and putting the cultivation of generous impulses within reach of all.

The Exhibition is organised by the British and Foreign School Society (with the help of Fraulein Heerwart and others) in the hope that parents of all classes will be led to a new and more thorough idea of what education implies, and how it may be followed out in the house (or the Kindergarten) and the school; and that teachers of Public Elementary Schools will gain help in availing themselves of the new provisions* of the Code of the Education Department, so to prepare the little ones for school life, that the elements of a sound education may be obtained without any risk of over-pressure. (Room No. 12.)

The British and Foreign School Society has confined its exhibit to this one branch, to give as complete an illustration of the Kindergarten system as possible. The work of the Society, however, embraces the interests of all classes of Public Elementary Schools, and includes the maintenance of six Training Colleges, accommodating 515 resident students—190 male, and 325 female. Its distinctive features are *Undenominational Religious Instruction* and *Representative Management*, and these it has practically illustrated since its establishment in 1808. (Room No. 12.)

RAGGED SCHOOL UNION, Exeter Hall, W.C. (JOHN KIRK, Sec.)

(See Class 56, Room No. 13.)

* New Code, Art. 106, s. H. "In order that this grant may be made, the scholars must be taught suitably to their age." Art. 106 b. "A merit grant if the Inspector reports the school or class to be fair, good, or excellent, allowing for the special circumstances of the case, and having regard to the provision made for (1) suitable instruction in the elementary subjects, (2) simple lessons on objects and on the phenomena of nature and of common life, and (3) appropriate and varied occupations."

CLASS XLVIII.

Primary Schools—(a) **Apparatus and Fittings**; (b) **Models and Appliances for teaching**; **Text-books, Diagrams and Examples**; (c) **Specimens of Work in Elementary Schools**.

1501. THE NATIONAL SOCIETY.—The National Society was founded in 1811 for “the Promotion of the Education of the Poor in the principles of the Established Church.” No part of the Church’s work is more important than that of imparting to the children of her poorer members a Christian education, and none has been more vigorously carried out since the beginning of the present century. There are at the present time 11,703 Church schools, affording accommodation for 2,413,676 children. In these schools there are in attendance each day on an average 1,562,507 children, or one half the whole number attending elementary schools throughout the country.

The Work of Seventy Years.—These figures, however, are far from giving an adequate impression of the efforts made by the Church in the work of education. From a careful investigation of the returns of the Education Department and of the National Society, it appears that the expenditure of the Church upon elementary education since the year 1811, when the National Society was founded, has been as follows:—

VOLUNTARY EXPENDITURE ON CHURCH SCHOOLS AND TRAINING COLLEGES.

	From 1811 to 1870.	Since 1870.	Total.
	£	£	£
SCHOOLS:—			
Building	*6,270,577	*5,489,256	*14,759,833
Maintenance	8,500,000	7,220,180	15,720,180
TRAINING COLLEGES:—			
Building	194,085	77,100	271,185
Maintenance	185,276	190,673	375,949
	15,149,938	12,977,209	28,127,147

* These figures are exclusive of the value of sites, which are often given in the case of Voluntary Schools. This would increase the total expenditure by at least a million pounds.

Training Colleges.—The National Society from the first saw the necessity for training teachers who should be well informed in their professional duties, and competent to give to the children under their charge a sound religious and secular education. Great efforts have therefore been made in this direction, and no less than 30 training colleges have been established at a cost to the Church of more than £270,000. In these colleges, which are capable of accommodating 2,229 students, two-thirds of the whole number of trained teachers in the country have received their professional education. In addition to the original cost of establishment, the Church has expended £375,000 in maintaining these colleges, and an annual sum of £10,000 is at present provided by the Church for this purpose.

Diocesan Inspection.—The work of testing the religious instruction in Church schools, which was discharged by the State down to the year 1870, is now carried on by the Church itself. A large body of experienced inspectors, acting in each case under instructions from the Bishop of the diocese, are engaged upon the work. The maintenance of these inspectors involves the expenditure of not less than £15,000 a year on the part of the Diocesan Boards, whose funds are in many cases largely supplemented by the National Society.

Progress of Church Schools since the passing of the Education Act of 1870.—From the returns of the Education Department it appears that the Education Act of 1870 gave a great impetus to the establishment of church schools. The accommodation has increased from 1,365,080 to 2,413,676, and the average attendance from 844,334 to 1,562,507, so that in the last thirteen years more than 1,000,000 additional school places have been provided by the Church, and the average attendance has been nearly doubled. In the same period the number of certificated teachers in Church schools has increased from 9631 to 19,201.

School Fittings, Books and Apparatus.—More than thirty-seven years ago the National Society, being impressed with the importance of providing the most approved school books

and apparatus at the cheapest rates, established a depository. The sales in the depository, which were £3000 in 1846, amounted last year to £57,810.

During the past five years a large number of new books to meet the requirements both of schools and training colleges have been published. These works have been entrusted to writers of reputation who have practical experience as teachers as well as a special knowledge of the subjects on which they have to write. Some of these books, e.g., Miss Yonge's Historical Reading Books and the New National Reading Books have met with a sale which is perhaps unexampled in the annals of school book publishing. At the same time no efforts have been spared to provide desks and other school fittings of the most approved patterns and with the latest improvements. The Society's exhibit in room No. 46 of the Central Guilds Schools and the catalogue will best show the numerous publications issued by the Society for use in elementary schools and training colleges. It is necessary, however, to call special attention to some of the more recent publications. The following books are intended for the use of teachers and training colleges:—"Manuals on the Science and Art of Teaching," Locke's "Thoughts on Education," "The Grammar, History and Derivation of the English Language," "The Teacher's Manual of Mental Arithmetic," and "How to Prepare Notes of Lessons." For use in schools the following books have been issued:—English, History Reading Books, Geography Reading Books, the New National Reading Books, Shakespeare's Historical Plays for Schools, annotated by Miss Yonge, Chapters in Popular Natural History by Sir John Lubbock, and Reading Books on Social and Political Economy, and on Botany. In the National Society's new series of wall maps, an attempt has been made to embody all the requisites necessary for a thoroughly practical set of schoolroom maps. They have been carefully prepared by an experienced teacher of geography, and they combine decided legibility of type with special clearness in representing the great physical and political features of each country. They are thus well suited for class teaching. They contain information of the latest date and from the most trustworthy sources. They show the chief places of historical interest, especially such as are likely to occur in reading books. They are not overcrowded with names. They are executed in the best style of the art of drawing and engraving. The price at which they are published is such as to bring them within the reach of all schools. The Society has also prepared a series of Religious Knowledge Manuals, adapted for religious instruction in day and Sunday schools. Whilst the society seeks to publish the best books in every department of school and college work, it collects the books of other publishers and supplies them to schools.

Voluntary Schools.—Whilst the Church has done so much for elementary education, the other religious bodies have not been idle. At the present time there is accommodation in Roman Catholic schools for 272,760 children, in Wesleyan schools for 200,564 children, and in British undenominational and other schools for 386,839. This makes a total of 860,163 school places provided by other religious bodies than the Church, and added to the number of places provided in Church schools gives a grand total of 3,273,839 school places in voluntary schools, or more than two-thirds of the whole school provision of the country.

The following statistics, which are taken from the returns of the Education Department, show the educational work done by the various religious bodies and by school boards since the passing of the Education Act of 1870:—

Year	Accommodation				Average Attendance			
	Church	British, Wesleyan, &c.	Roman Catholic.	Board	Church	British, Wesleyan, &c.	Roman Catholic	Board
1870	1,365,080	411,948	101,556	—	844,334	241,989	66,066	—
1871	1,439,428	459,761	113,490	—	891,484	266,839	73,111	—
1872	1,606,621	531,518	140,599	17,156	950,813	296,464	80,155	8,726
1873	1,751,697	513,558	162,236	125,058	1,017,688	305,981	88,828	69,983
1874	1,889,236	557,883	179,199	245,508	1,117,461	322,633	100,372	138,293
1875	2,011,434	571,582	189,236	387,227	1,175,289	328,180	106,426	227,285
1876	2,105,849	563,566	200,753	556,150	1,217,619	327,914	110,969	328,071
1877	2,171,639	563,485	213,172	705,122	1,273,041	332,140	117,969	427,533
1878	2,252,794	572,852	226,497	890,164	1,308,029	351,785	126,305	559,078
1879	2,301,073	582,284	242,403	1,016,464	1,426,595	361,969	136,690	669,741
1880	2,327,379	582,600	248,140	1,082,634	1,471,615	364,420	145,629	769,252
1881	2,351,235	582,776	261,354	1,194,268	1,490,429	364,113	152,642	856,351
1882	2,385,374	584,968	269,231	1,248,746	1,538,408	370,602	160,910	945,231
1883	2,413,676	587,403	272,760	1,396,604	1,562,507	373,493	162,310	1,028,904

1502. CHURCH OF ENGLAND SUNDAY SCHOOL INSTITUTE, Serjeants' Inn, Fleet Street, London (JOHN PALMER, Secretary).—The Exhibits of this society are divided into two sections, representing—(1) A Model of a Sunday School building, with improved seating arrangements. (2) Sunday School Text Books and Apparatus.

SECTION I.—MODELS.

Under this heading the Exhibits consists of—(1) Model of a School.—Shows a room arranged for class and collective teaching, with improved seating arrangements. (2) Sunday School Class.—Shows the seats arranged for simultaneous teaching, mission or children's services. The model is composed of five dual forms, which would accou modate a class of ten pupils. The seats are hinged, can be quickly moved into one length, and utilized for other purposes. Backs can be supplied to the seats at a small cost. (3) The Teacher's Chair.—The special advantage of this chair is that it will put an end to one of the principal causes of confusion prevalent in many Sunday Schools. The seat forms a well, which is capable of holding all the books, &c., required by the teacher for the use of his class. Each chair is furnished with a spring lock.

SECTION II.—TEXT BOOKS AND APPARATUS.

The following is a complete list of books and apparatus required for placing a Sunday School in a state of efficiency. The subjects can also be graduated so as to be taught at the same time in each division of an ordinary Sunday School:—(1) Lesson notes for Teachers, graduated for infant, medium, and senior classes. The courses of lessons include the following:—The Old Testament, The Gospels, The Acts and The Epistles, Church Teaching, Church History, and Lessons for Infants. (2) Magazines for Teachers and Scholars, hymn books, manuals, services of song, school liturgies and services, catechisms, coloured pictures and cards. (3) Admission and Roll Books, class conduct registers, together with the usual certificates, cards, reports, &c., which form part of the essentials of a properly conducted Sunday School. (Room No. 13.)

1503. COMMITTEE OF THE MANCHESTER ART MUSEUM, MANCHESTER.—In all large English towns there are districts chiefly inhabited by the poorer classes of workpeople, who know very little of the beauty of nature, of art of any kind, of noble human action, passion, or thought. They never, or very rarely, see anything which is beautiful. In childhood they know nothing of birds and flowers, of trees and grass, and ferns. The revelations of the beauty and wonderfulness of the world, and of the great powers possessed by human beings, which art conveys to the more fortunate classes, hardly reach them at all. The evil caused by this kind of ignorance would be very great even if it were limited to the direct results of the deprivation of the kinds of knowledge which have most power to create wholesome feeling and thought. But the evil is not thus limited. The inhabitants of the districts in question not only do not see or know of those things which are best fitted to create wholesome thought and feeling, but have constantly before their eyes countless examples of many kinds of human degradation, of vice, crime, and hopeless misery, and of all that is foul and base in human thought and work. As the same relation between what is familiarly known and what is habitually felt and thought which exists for human beings elsewhere, exists for the people in the lowest parts of towns, and they have not the degree of independence of their immediate surroundings which education and travel give the well-to-do classes, it is obvious that if the level of their life is to be raised, they must be provided with the kinds of knowledge which are most productive of healthy feeling and thought.

As the subject of technical education is now receiving much attention, it may be well to point out in this connection that persons whose childhood has been passed in places where beauty is almost unknown, necessarily lack qualities which must be common if English commerce is to be prosperous—the qualities needed by good designers. These qualities are a keen sense of beauty of colour and form, and knowledge of the best ways of applying this beauty to purposes of decoration. Schools of Art and Museums can give knowledge of the best ways of applying beauty to decoration, but keen sense of beauty can, as a rule, be gained only in childhood, and can be gained then only by habitually seeing beautiful things.

The Committee of the Manchester Art Museum believe that by means of a small Art gallery in every crowded town district, and of small collections of works of art lent to the elementary day schools and Sunday schools in the district, much knowledge of the kinds most productive of healthy feeling and thought may be given. The collection of pictures which they exhibit partly illustrates the system which they have adopted in Manchester, where the Corporation have given them the management for two years of two rooms in the Queen's Park Art Gallery. This gallery will be opened by Mr. Mundella on July 5th. The collection exhibited contains examples of some of the classes of pictures which the committee lend to schools. Each school can have its collection replaced by another from time to time.

The school collections include engravings, photographs, and chromolithographs of such pretty places as town children see on the rare occasions when they are taken out of town—country lanes, woods, fields, farm yards, shipping and coast scenery—buildings and places and events which they read of in the Bible, and in their geographical and historical lesson books. The collections also include good coloured pictures of common wild and garden flowers, ferns, grasses, forest trees, common birds, moths, and butterflies. Pictures of fine action and passion, and any others which are likely to excite wholesome feeling or thought are also included. It is hoped that children who are led to look with attention at the pictures will, when they see any of the things represented, look at them with more interest, and that, having seen the things, they will then gain more pleasure from the pictures. It may be hoped also that familiarity with the pictures of flowers will tend to encourage the practice of growing plants at home. The Committee intend that the school collections shall eventually contain examples of casts of sculpture, pottery, textile fabrics, and other products of industrial arts—the pottery to consist chiefly of cups, jugs, and other things used in every house—but at present the collections consist only of pictures. Each picture lent is provided with a label containing a few words of explanation of the subject, and, when the picture is of low price, a statement of the price. Reference is made to books containing information about the subject when this can be done. The central Art Gallery contains a collection of all the appliances used in etching, wood engraving, chromolithography, and other art reproducing processes, and explanations of these processes. In the labels attached to the pictures lent to schools, the school children are referred to the collections and explanations in the central Gallery.

The Gallery contains, in addition to collections of products of most of the industrial arts, pictures of religious subjects, scenes from history, real or imaginary, portraits of well-known persons, scenes of social life, scenes of child life, pictures of well-known places, of beautiful scenery—amongst others, of scenery in the neighbourhood of Manchester; of trees, plants, and flowers, especially of those of the district round Manchester; of animals, &c., &c. Some of the pictures have been chosen as good examples of the kinds of art which many work-people could afford to buy. In all such cases the price is stated on a label. The gallery also contains a model small house, which has been furnished by Mr. W. Morris and Mr. W. A. S. Benson, and which, the Committee believe, will teach more convincingly than any lectures or books could do, that beautiful things can easily be obtained by thousands of persons whose houses at present contain nothing which they can admire. The Committee are convinced that the plan which they have adopted of connecting the small school collections with the larger collections in the Art Gallery will add greatly to the usefulness both of the gallery and of the school collections. (Corridor, Second Floor.)

1504. THE SUNDAY SCHOOL UNION, 56 Old Bailey, London.—This institution was established 81 years ago, its objects being—first, to stimulate and encourage Sunday-school teachers, at home and abroad, to greater exertions in the promotion of religious education; secondly, by mutual communication to improve the methods of instruction thrifly, to ascertain those situations where Sunday-schools are most needed, and promote their establishment; fourthly, to supply the books and stationery suited for Sunday-schools at reduced prices. Not only does the Sunday School Union stimulate and encourage Sunday-school teachers at home and abroad to greater exertions in the promotion of religious education, but it seeks by mutual communication and by the Press to improve the methods of instruction. Having this end in view, the Sunday School Union has instituted examinations of teachers in scripture history and doctrine, the evidences, and the principles and art of teaching. It has also established normal and training classes. (Room No. 13.)

RAGGED SCHOOL UNION, Exeter Hall, W.C. (JOHN KIRK, Secretary).
(See Class 56.)

CLASSES L. & LIII.

Handicraft Teaching in Schools for Boys.—(a) Apparatus and Fittings for Elementary Trade Teaching in Schools; (b) Specimens of School Work.

Technical and Apprenticeship Schools—(a) Apparatus and Examples used in Primary and Secondary Schools for teaching Handicrafts; (b) Models, Plans, and Designs for the Fitting up of Workshop and Industrial Schools; (c) Results of Industrial Work done in such Schools.

1505. COACHMAKERS' COMPANY OF THE CITY OF LONDON.—School Department.—Exhibits to illustrate the progress of Technical Education in the Carriage Trade. RESULTS OF PRIZE: offered by the Coachmakers' Company of the City of London, from 1872 to 1884, for Drawings of Carriages, and Freehand Drawings, and Essays. Results of the

St. Mark's Drawing and Technical Class, held in George Street, Grosvenor Square. Selections of five full-sized Drawings, a number of Carriage Working Drawings to inch scale, a series of Free-hand Drawings, a series of problems in Geometry worked out, and various technical questions with answers, all by working-men and youths in the Coach trade in London and other towns and cities of England. The art of drawing is taught and technical instruction is given in classes in two places in London; also in Manchester, Newcastle-on-Tyne, Worcester, Leamington, besides private studies in Warrington, Hull, and other places. The classes are held in the evening, two or three days a week during the winter months, and the instructors are qualified and superior mechanics in the Coach Trade, and for Freehand and Geometry qualified and certificated masters from South Kensington. Examinations are also held every year by the City and Guilds of London Institute, in technical questions, in May. The number of students is yearly increasing, and it is believed that several hundred youths and men were last winter under instruction. The specimens shown are very limited in number on account of the great space occupied by them. (Corridor 2nd Floor.)

1506. INSTITUTE OF BRITISH CARRIAGE MANUFACTURERS.—

Methods and results of Technical Education as applied to the art of the Carriage Manufacturer.—For a long series of years the carriages made in London have had a world wide celebrity, and buyers from all parts of the world have come to London when requiring the finest specimens of the art. There were several reasons for this: the British nobility and gentry had inherited and cultivated a taste for good carriages and good horses—they took a pleasure in the practice of driving one, two, and four horses, encouraged excellence in the animals and the vehicles, the servants, the harness, the liveries, the roads—even the roadside inns. Besides this, King Charles II. granted a charter incorporating the Guild of Coachmakers of the City of London, whose duty it was to watch over the trade, to foster and develop it, to punish fraud and bad work with severity, to train apprentices, and in its political capacity to assist in choosing suitable men as Lord Mayors and Sheriffs, who should as heads of the great Corporation, keep the Masters, Wardens, Liverymen and Freemen, to their duties. As long as the members of the Guilds were restricted to men following the trades that gave the name and *raison d'être* to the company, all went well: a time came when other men having but a slight connection with the trade, or no connection whatever, were admitted to the Guilds as Liverymen, and these, by introducing in their turn similar uninterested men, at last virtually supplanted the trade members.

At the beginning of this century the London Coachmakers numbered among their body a group of men as inventors, mechanicians, and patentees, who still further raised the existing reputation of London carriages,—among them were Hatchett, Hobson, Collingridge, Barker, Cook, Hopkinson, and Elliott.

Hatchett and Hobson gave a style, proportion, and finish to their productions that had not before been reached: they were artist workmen and producers in the true sense of the word. Collingridge and Cook were under the immediate patronage of King George IV., who not only personally and frequently consulted with them, as to improvements in construction, style, and colour, but induced the nobles of his court to follow his example. This led to fame and wealth for the makers, and a large and profitable trade for many others, who saw and copied that which the king approved.

Elliott, about this time, invented the system of suspending carriages on elliptic springs without a perch—reducing the weight and cost, and creating a revolution and improvement in carriage construction that is adopted in all parts of the world where carriages are built.

About the same time Collingridge invented and patented the improved axles (to carry oil) that bear his name, and his system of axle construction is now universal.

Besides them were other men, not so much inventors or mechanicians, as men of enterprise, energy, and business capacity, who attracted trade to the metropolis.

The introduction of railways reduced the demand for carriages drawn by horses, and carriage builders had entirely to remodel their carriages and construction to meet altered conditions of locomotion.

The more recent introduction of tramways is again altering these conditions in two ways: first, by rendering the light wheels with narrow tyres unsafe for use in towns having tramways, by reason of their falling into the grooves and being wrenches to pieces; and, secondly, by enabling many business people to travel to and from their homes at less cost than in their own separate or private carriages.

Technical education has been encouraged by a few London and provincial houses, with a view to render the style and construction more perfect, and to give a theoretical as well as practical knowledge to the young men now in training for employers, managers, and workmen. Excellent carriage drawings had for many years been executed by employers and trained draftsmen, but the first steps towards theoretical training were taken by a joint committee of employers and workmen in 1864, who brought together a collection of working drawings, designs, models, and *objects of interest* as an Operative Coachmakers' Industrial Exhibition, held by the permission of the Coachmaker's Company in their civic hall.

It was opened (on February 1st, 1865) by the late Earl of Shelburne and the late Dr.

Milman, Dean of St. Paul's, supported by the late Lord Torrington, Sir Henry Cole, Sir S. Tyler, Professor Bentley, Thomas Winkworth, Captain Fowke, R.E., W. Clode, G. T. Wilson.

In the years 1866-7 four practical carriage builders joined the Company, and soon began to make their voices heard in favour of rendering the Company a useful institution, and rousing it from its torpor. In the year 1867 a few small prizes were offered for drawings, and year by year, or as occasion offered, the amounts were augmented.

In the year 1874 the new master offered a prize of £20 for an essay or treatise on "Coach-Body-Making." His successor the next year offered a similar prize on "Carriage Making," and in succeeding years prizes were offered for essays on coach painting, coach trimming, the manufacture of carriage axles, springs, ironwork, and wheelwright's work.

In the year 1876 two members of the Company invited a number of employers and workmen to meet them with a view to found a class for teaching freehand, and carriage drawing to any one willing to learn. A teacher of freehand drawing was engaged; a small beginning was made, the two founders attending regularly with the students, and working side by side with them for several months.

The chairman of the committee of management of the St. Mark's class (as it had been called from meeting in the parish room attached to St. Mark's Church) commenced the teaching of technology by delivering a lecture to the class on October 1st, 1877, "On the Principles to be Observed in Designing Carriages," and in which he foretold that a good future was before the class, and that from among the students and others would arise teachers who would be able to give practical and theoretical teaching combined; this is the system and result as carried on now after an existence of eight years, and passing from two to three hundred students through the class, some of whom have attained great proficiency, and materially advanced their social as well as pecuniary position.

Similar classes have been established in Manchester, Newcastle-on-Tyne, and Worcester, all of which send specimens of the results of technical teaching.

A great impulse was given to the technological teaching by the foresight and suggestions of Col. Donnelly, who in 1872 induced the Society of Arts to examine candidates in the theory and practice of the trades they followed.

One feature of the work is to simplify the manufacture by the adoption of standard sizes for certain of the working mechanical portions that tend to an excessive complication and variety of practice, and lead to great delays and cost in repairs, and frequent inconvenience to employers in the excessive variety and multiplicity of patterns, creating waste, locking up capital, and enhancing cost without any corresponding advantage to either producer or purchaser.

Practical papers have been written and read before members of the Institute, foremen and workmen—"On the Advantages of Adopting Standard Sizes for Parts of Carriages;" "On a Carriage Builder's Tour in America;" "On Taxes on Carriages;" "On Carriage Building in America;" "On Coach Laces and Trimmings;" "On the Timbers used in Carriage Building;" "On Art Applied to Carriage Building." Others are promised, "On Carriages for Countries without Roads;" "On the Art of the Coachsmith;" and "On the Art of the Carriage Axle Makers."

Steps are being taken to ascertain the requirements of carriage purchasers in all parts of the world, as regards the width of road tracks, state of roads, climate and wants and habits, that have to be specially studied and provided for.

Statistics on various subjects connected with the manufacture have been compiled, have already been made use of and will probably be turned to useful and profitable account in the future.

The foundation of a library of reference has been made, and the Institute already possesses, by the courtesy of the Commissioners of Patents, copies of every patent relating to carriages dating back several centuries. These are bound and indexed, and are available for inventors and patentees.—(Corridor 2nd Floor.)

1507. ST. MARK'S TECHNICAL AND DRAWING CLASSES FOR COACH ARTISANS (THOMAS COWARD, Secretary), 38 George Street, Grosvenor Square. (1) Drawings of Carriages. (2) Perspective Drawings of Carriages. (3) Problems in Geometry, Plane and Solid. (4) Freehand Drawings. (5) Drawings of Parts of Carriages. (Corridor 2nd Floor.)

1508. McNAUGHT & SMITH (Technical Class), Worcester.—Scale Drawings of Carriages. (Corridor 2nd Floor.)

1509. MANCHESTER TECHNICAL SCHOOL (THE) (J. H. REYNOLDS, Secretary).—(1) Diagrams, Drawings, and Models illustrating instruction in building construction. (2) Apparatus illustrating instruction in geometry and botany. (Room No. 14.)

1510. OLDHAM SCHOOL OF SCIENCE AND ART (THE) (J. P. PHYTHIAN & J. ROBERTSON).—Machine Construction Sketches, upon black paper, 6 ft. by 4 ft., ruled in 3-in. squares, drawn in coloured chalks, representing materials used in construction. These

examples were worked in the presence of the students, explanation of principles given, and a quick insight into a number of mechanical arrangements obtained. The diagrams are also used in the applied mechanics and steam classes. The students follow line for line in reduced proportion. The copies can be subsequently worked out with mathematical instruments, and supplement the ordinary classwork of mechanical drawing from freehand outlines. The master's preparation is by sketches from the mechanical journals, &c. (Room No. 14.)

1511. GILKES, GILBERT, & CO. (late WILLIAMSON BROS.), Kendal. Models of Machine Details prepared under the direction of the Science and Art Department, as Aids to Instruction in Machine Construction and Drawing, by Professor W. C. Unwin.

Models of Couplings or Shafts.—(1) Muff or Box Coupling; shafts without bosses at ends; sunk key-way; half-full size. (2) Half-lap coupling; shafts with bosses and neck half-full size. (3) Flange Coupling, bolts sunk into flanges, to obviate danger of their seizing anything in revolving; a box-key is required to loosen the nuts; half-full size. (4) Pedestal with Cap, brass steps and wall plate. This model is cut by sectional planes to show how it would appear in sectional drawings; locking nuts on cap bolts; the wall-plate permits the adjustment of the pedestal laterally; it is adjusted vertically by packing up with hard wood between the pedestal and wall-plate; full-size. (The above model illustrates Diagram IV., No. 20.) (5) Part of Rim, one arm, and nave of spur-wheel; epicycloidal teeth; half-full size. (6) Part of Rim, one arm and nave of bevel wheel, and the same parts of the corresponding bevel pinion; half-full size. (7) Part of Mortice Spur-wheel. (Models 109-112 illustrate Diagram VII., No. 20.) (8) Cast-iron Crank and part of Shaft; the crank pin fixed by shrinking on and riveting; crank shaft with boss having key-way and neck; half-full size. (9) Solid Connecting Rod End; brasses adjusted by sliding wedge moved by screw; half-full size. (10) Forked Connecting Rod End, with straps, gibs, and cotters; part of piston-rod, with its cross-head; slide bars and slide blocks; model half-full size. (The above model illustrates Diagram X., No. 20.) (11) Model of Piston. (Illustrates Diagram XIII., No. 20.) (12) Air Pump Valve, brass gratings, brass guard and india-rubber valve; half-full size. (Illustrates Diagram XV., No. 20.). (13) Gland Steam Cock; cut by planes of section to show internal construction; full size. (Illustrates Diagram XVI., No. 2 c.) (Room No. 14.)

1512. CHANNON, JOHN, 18, Newland Street, Pimlico, S.W.—(1) A brick finial of Renaissance design. (2) Working drawings of the same. No. 1 Sheet of drawings represents the full amount of detail which would be sent from the architect's office. It will be seen that to execute this in brickwork, is a task requiring some amount of thought as well as handicraft skill, and that in order to obtain a proper completion of work of this description it is absolutely necessary that the workman and foreman should both be practical men, and also have a thorough knowledge of drawing; indeed it would be impossible to execute the work properly without a further workshop drawing, as shown on No. 2 Sheet; it is here the practical man makes allowance in his material for that amount of waste which must occur in detail work, and practice alone can supply this information. The plan of the base, Sheet No. 2, gives the bond and true size of each brick in the first three courses. It will be also observed the bond throughout is the same as in a brick wall (the sizes of bricks are gauged to the work), the vertical joints being properly bonded. The plan of consols, Sheet No. 2, shows the bond and true shape of bricks as cut in the first instance, with sufficient material to allow the working of section of consols, and sinking the face as shown at "Half Plan, A A" and "True description of Consols," Sheet No. 1. In arranging the horizontal joints care must be taken not to injure the appearance of the design, therefore the thickness of each course must depend on the section of the work, the object being to suit the eye, and for this reason, where possible, the distances measured on the section of the moulding between each horizontal joint should be equal, otherwise the courses will appear different in thickness. Figures 1, 2, 3 and 4 show the plan and bond of each course as numbered, red lines in all cases indicating joints. The section of each course can be obtained from No. 1 Sheet. If necessary, the finial can be taken into three parts, in order to see that the plan of bond corresponds with the drawings. (There are no joints at B and C; see No. 1 Sheet.) The joints of ordinary gauged brickwork are made with putty lime, which answers very well when the bricks are bonded with, and well grouted in, the wall; but when the work (as in this case) depends on its own joints, or if for carving, dry white lead, properly mixed with shellac dissolved in naphtha, will combine the bricks as one solid block. Joints made in this way cannot be broken without crushing the whole. This kind of brick, although soft, and therefore cheap to work, hardens by the weather, and consequently is adapted for external decoration. Work executed on this system is much less costly than bad work. As a rule, bad work is the result of a want of system, rather than haste. With these drawings no brick need be cut wrong nor fitted twice, the time taken to set them out in the workshop is small compared to the inevitable waste of time and material without them. It is to be hoped

time is not far distant when all artisans will obtain that kind of instruction which will lead them to execute their work on scientific principles. (Room No. 14).

1513. L. FRANKS, 1 & 2 Hutchison Street, Aldgate, E.C.—The importance of handicraft work as a stimulus in the education of youth has long been recognised. Already many institutions on the continent of Europe have accomplished the most brilliant results. Notably those in North and South Germany, Austria, Hungary, &c., and especially the Deaf and Dumb Institute at Metz, at all of which instruction is given in the art of fret cutting by hand. It is useful, ornamental and instructive, easy to work and most effective in its results, as proved by the articles exhibited. (Room No. 14.)

1514. THE SHEFFIELD SCHOOL BOARD CENTRAL SCHOOLS.—*Examples of Technical Work at the Central Higher School of the Sheffield School Board.* These Exhibits are intended to illustrate the Technical Instruction given in the Sheffield School Board's Central Higher Schools, referred to in the Report of the Royal Commission. Pupils are admitted to these schools only on passing an entrance examination, and the majority of those now under instruction are drawn from the upper classes of ordinary public elementary schools. The course of study is framed with the view of preparing young people for useful careers, either in connection with the industries of the district or in Educational Work. All the pupils take the ordinary code subjects together with some of the specified subjects. Both boys and girls throughout the school are taught French; some of the upper classes take German, and a few Latin. The girls also take needlework and practical cookery.

Science Course (Boys).—Practical, plane, and solid geometry; machine construction and drawing; mathematics; mechanics; chemistry, theoretical and practical; magnetism and electricity. (*Girls*): Chemistry, theoretical and practical, magnetism and electricity, animal physiology, hygiene.

Art Course.—Freehand, model, perspective, and geometry; drawing from the cast, modeling in clay.

Practical Work in the Workshop.—The production of simple, but perfect geometrical forms in iron and wood, such as the cube, hexagonal prism, &c., to teach accuracy of work, and skill in the use of tools. The construction of models in wood suitable for use in schools as examples for model drawing; also of various kinds of wood joints, model doors, &c. The construction of simple apparatus to illustrate by actual experiment the principles of levers, of levers in combination, pulleys, wheel and axle, the crane, strains on beams with different positions of load. The mechanics of the roof, arch, bridge.

In the above course an attempt has been made to solve the problem of providing the proper connection between the theoretical instruction of the class room and the practical instruction of the workshop. Hitherto the practical work has been carried on among the boys of the senior class only, and the tools and materials used have been supplied by the manufacturers of Sheffield as gifts to the school. The specimens of work exhibited consist (1) Of Wood and Iron Work made by boys whose ages range from 12 to 16 years; and (2) Of Mechanical Drawings made by the scholars of the Day School, or by those who have passed through the Day School, and are now continuing their studies in the Board's Evening Classes. There are also drawings which have been made by young artisans attending the evening classes.

The Workshop Exercises have been arranged so as to give the pupils a really useful training in careful and accurate workmanship. The chief aim is instruction and not recreation. After the pupils can fairly well make some of the more important wood joints, mortise and tenon, dovetailing, &c., they are encouraged to make useful articles of various descriptions. Some attempt has been made to teach the elements of roof construction. The iron work exercises afford a good training in the use of the hammer, chisel, and file. The blocks with square edges have been cut from rough irregular pieces of wrought iron, and the boys have endeavoured to make the faces square and true by the aid of the steel square and straight edge. The nuts have been filed and made hexagon by the aid of the gauge. The geometrical solids (octahedra, &c.) have been filed up from castings. Other exercises are intended to be added from time to time, such as simple wrought iron model gates, screens, &c., to illustrate the welding, bending, and riveting of iron. It is not intended to teach any special trade; but the samples of work serve to show what can be done by young boys after a few months' training, spending 3 or 4 hours per week at the bench. This work coupled with the mechanical drawing taught in the school has had a considerable influence on the tastes and aims of the pupils. They are nearly all anxious to learn some trade, and seldom offer themselves for clerkships.

The Mechanical Drawing Exercises, usually worked by the pupils, are based upon the syllabus for Machine Construction and Drawing issued by the Science and Art Department. The time spent on this subject is 2½ hours per week, about one half of which is devoted to actual drawing with instruments, &c., and the remainder to taking notes of lessons on the strength and properties of materials, discussion as to the uses of various kinds of fastenings, the parts of machines, mechanical motions, &c. This course is also supplemented by the instruction arising out of the connection established in the school between workshop and class-room. The joints, iron models, roofs, cranes, &c., made at the bench are illustrated and discussed in the class-room while the working sketches are being made, and some finished drawings of such workshop exercises are included in the exhibits. The roof diagrams contain complete working drawings with all the important details of their construction taken out and enlarged for the

help of the workmen who may have to work from such drawings. Some elementary instruction has also been given in graphic statics for the determination of the stresses on struts, tie rods, &c. Some of the best work exhibited from the evening class in this school has been done by students who were formerly pupils of the day department, and who are continuing their studies in the evening classes.

Mr. A. Newell is Principal of the School, and the work here exhibited has been carried out under the direction of Mr. W. Ripper, Assoc. Institute Mech. Eng., who is the science master of the day school and the organising master of the evening classes and Technical Department. (Room No. 14.)

1515. ALLAN GLEN'S INSTITUTION, Glasgow.—The aim of the Allan Glen's Institution is to supply a sound general education in English, Mathematics, Latin, French, German, Drawing, and the elements of Physics and Chemistry, with a special additional course of instruction for two years in purely technical subjects. The latter consist of:—Mathematics, Theoretical and Applied Mechanics, Steam and the Steam-Engine, Practical Solid Geometry, Machine Construction and Drawing, Inorganic Chemistry. All the instruction is made as practical as possible by means of exercises in the workshop and laboratory. No attempt, however, is made to teach a trade in the Institution. The object rather is to prepare boys to learn trades whose mastery implies a considerable amount of scientific knowledge. Pupils are not admitted to the laboratory and workshop till they reach the highest class of the Secondary Department of the Institution and have begun the studies to which their attention is afterwards to be confined in the Technical Department. The Drawings, Models and other articles now exhibited are a portion of those made by pupils during the last four years. All the models have been made from working drawings.

SPECIMENS OF SCHOOL WORK.

A. Models of Machines and Machine Parts.—(1) Sectional Model of Steam Engine. (2) Sectional Model of Marine Boiler. (3a) Model of Open Safety Valve. (3b) Model of Closed Safety Valve. (4) Model of Footstep. (5) Models of Shaft Couplings, various. (6) Model of Crank Disc. (7) Model of Flanged Pulley. (8) Model of Wall Bracket. (9) Model of Riveted Joints, various. (10) Model of Portion of Wrought Iron Girder. (11) Model of Corner of Cast Iron Tank. (12) Model of Corner of Wrought Iron Tank. (13) Model of Cast Iron Crank. (14) Model of Slide Valve. (15) Model of Connecting-rod End. (16) Model of Knuckle Joint. (17) Model of Joint in Carpentry. (18) Model of Camb Motions, two. (19) Set of Patterns and Castings for Model of Oldham's Coupling. (20) Model of India-rubber Flap Valve. (21) Sheet Iron Model of Water Wheel. (22) Three Surface Plates, made without Standard. (23) Pattern of Frame for Double-purchase Crab.

B. Patterns and Castings of Steam-Engine for School Workshop.—(24) Sole Plate. (25) Pillow Block for Crank Shaft. (26) Crank Discs. (27) Crank Shaft.

C. Models for teaching Drawing and Solid Geometry.—(28) Various.

D. Mechanical Drawings and Designs.—(29) Isometric Projection from measurement of the Chemical Laboratory of the Institution. (30) Working Drawings of Steam Engine designed by pupils for School Workshop, various. (31) Drawings from rough dimensioned Sketches, and from measurement, various. (Room No. 14.)

1516. JAMES RIGG, 11 Queen Victoria Street, London, E.C.—*Subject I. Practical, Plane, and Solid Geometry.*—(1) Large Wooden Compasses, for black board use, with crayon holder and improved joint. (2) Universal Model Holder of metal. (3) Mensuration Board for class or lecture-room teaching. (4) The Binomial Cube, in a box, to show by experiment that $(a + b)^3 = a^3 + 2 ab + b^2 (a + b) = a^3 + 3 a^2 b + 3 ab^2 + b^3$. *Subject II. Machine Construction and Drawing.*—(5) Combined Lap and Butt Joint. This joint has recently come into use in locomotive boiler construction. (6) Single Riveted Lap Joint, Rivets with common snap heads, showing their diameter and pitch and the overlap of the plates. Made of wrought-iron. (7) Double Riveted Lap Joint: less metal being punched out in the line along which the plate tears, and the shearing area of the rivets being proportionately increased, this is a stronger joint than the last one. (8) Twelve Forms of Bolts, in iron. (9) Four Cast-Iron Plates, in one plane, connected by flanges and bolts, with chipping strips so placed that the joints can be caulked with cement from the inside. (10) Similar Model, showing arrangement of plates of a tank having outside flanges caulked with cement from the inside. (11) Junction of Cast-Iron Plates by means of bolts and flanges, corner junction of three plates with outside flanges. (12) Corner of a Cast-Iron Tank, as used for supplying locomotives at stations, and consisting of six pieces, inside flanges and space for cement. Quarter usual size. (13) Knuckle Joint. This model is of much value in giving the correct strength for an arrangement so much used. (14) Proportions of Cotters. Model explaining the method and proportion of cotters for uniting shafts and resisting shearing strain. (15) Gib and Cotters used for connecting strap-shaped parts. (16) Hydraulic Joint, as used in Sir W. G. Armstrong's accumulator pipes. (17) Wrought-iron Crank Shaft. (18) Half Lap Coupling, with bosses and necks. (19) Box Coupling, with parts of shafts and key. (20) Flange Coupling, partly

in section, with turned bolts and nuts. (21) Disengaging Coupling or Clutch and Portions of Shaft. (22) Wall Plate, with pedestal, partly in section and steps complete. (23) Wall Plate and Bracket, for shafting. (24) Bracket Bearing, to receive a pedestal. (25) Hanger Pedestal, used for carrying shafting from ceiling joists. (26) Wall Box, for supporting pedestals. (27) Footstep Bearing, for supporting vertical shafts. (28) Stepped Speed Cone, for 3 speeds. (29) Ordinary Strap Pulley, having arms of elliptical section. (30) Model, in wood, of a wrought-iron hook and swivel, suitable for a six-ton crane, full size. (31) Model, in hard-wood, of a wrought-iron hook, suitable for a two-ton crane; to be attached direct to a chain fall size. (32) Plate Link Chain, used for working heavy loads. (33) Ordinary Straight Hand Lever, for working machinery. (34) Ordinary Straight Treadle Lever. (35) Winch Handle, or Cranked Lever. (36) Wrought-iron Crank, Crank Pin, and Shaft Journal. (37) Cast-iron Crank and Crank Pin. (38) Disc Crank and Pin. (39) Cast-iron Eccentric, in halves, with brass-flanged strap and connecting rod end. (40) Strap Connecting Rod End. (41) Box Connecting Rod End, dispensing with loose strap. (42) Coupling Rod Joint, arranged to diminish friction and wear. (43) Forked Connecting Rod End, Piston Rod and Cross Head, with straps, gib, and cotter. (44) Wrought-iron Slide Bars, with Cross Head, having wearing face. (45) Piston, with junk ring and wedge spring ring; and part of Piston Rod, with collar and keys. (46) Cylinder Cover, Gland and Stuffing Box, partly in section. (47) India-Rubber Disc Air Pump Valve, brass grating and guard. (48) Lift or Puppet Valve. (49) Engine Side Valve, with portion of valve rod. (50) Sectional 1½-in. Gas Plug Tap, in wood, flanged. (51) Sectional 1½-in. Solid Bottom Tap, in wood and brass, with gland and bolts, flanges turned. *Subject III.—Building Construction.*—(52) Model of a King Post, suited to a span of 2 feet. (53) Model of a Six-Inch Trussed Partition. (54) Model of a Trussed Timber Beam for Traveller. (55) Model, in hard-wood, of a portion of a Box Girder for a traveller for thirty-in crane, showing bridge rail, one-eighth full size. (56) Model, in wood, of parts of an iron Principal, including cast iron shoe; Main wrought-iron Tie Rod, with cotter and ragged bidding down bolts, also diagonal and vertical struts and ties. *Subject VI.—Theoretical Mechanics.*—The following have been prepared from Models made under the direction of the late Professor Robert Willis, M.A., F.R.S., at the request of the Science and Art Department. (57) A Set of Mechanical Powers, also adapted for the illustration of other principles of Statics. (58) Lever. (59) Wheel and Axle. (60) Pulleys. (61) Inclined Plane, Graduated Plane, with variable sides. (62) Wedge. Wooden frame and two wedges. (63) Screw. (64) Parallelogram of forces. (65) Model to illustrate the action of "skew bevels," for communicating motion between axes whose directions neither meet nor are parallel. (66) Set of three Eccentric and Elliptic Toothing Wheels. (67) Mangle Wheel, reciprocating motion. (68) Reciprocating Motion, by a double rack and segmental teeth. (69) Two Spur Wheels, of wood, with teeth of the epicycloidal form and of large size, prepared with surfaces, showing the nature and direction of transmitted pressure during their sliding contact, and all the circumstances of their mutual action, the varying position of the points of contact with reference to the line of centres and pitch circles, &c., &c. (70) Model of a Conical Toothing Wheel and Toothing Cone, to produce a rotation with varying velocity, upon Roemer's principle. (71) Worm Wheel and Worm, on Hindley's principle, having many teeth in contact. (72) Eccentric Pin and Slit Bar, with discs, to produce rotary or oscillatory motions, by sliding contact. (73) Continuous Slow Motion, which may be used for counting the number of revolutions of a shaft, and consisting of a pin and plate, with semicircular teeth. (74) Boiler Punch, showing how, by a properly constructed cam, the greatest power of the machinery may be applied in the act of punching. (75) Screw, returning into itself; used for the uniform and alternate traverse of a rod, for such purposes as laying the thread on the bobbin in spinning. (76) The Quick Return Motion, derived from No. 72; as used in Whitworth's shaping machine and other tools, all the motion parts being shown. (77) Reciprocating Motion, by a triple tooth rack; this was used about the year 1690. (78) Model, to illustrate various conditions of wrapping contact or endless band motions. By this apparatus may be explained the use of a weighted or spring-stretching pulley. (79) Intermittent Motion, by hoop and pin wheel, showing a method by which machinery may be locked or fixed except at the instant of motion. (80) The Principle of Calculating Machines, illustrated by a working model, for addition and subtraction to three places of figures, as an example of ratchet works the method is that adopted for stamping progressive numbers on railway tickets or paying books. (81) Transmission of Axial Motion, by means of a face-plate with cross grooves, contrived about 1841; name of inventor unknown. (82) Link-work, connecting two parallel axes with side rods, employed for connecting the wheels of locomotive engines. (83) Link-work, to show Boehm's motion, by which three straight bars and two face plates are employed to communicate equal rotation from one shaft to another, parallel thereto. (84) Rotary or Oscillatory Motions, with varying velocities, produced by link-work in iron, with discs. (85) Motions, illustrating the action of the pedal of the harp (as an example of link-work), showing how flat, natural, or sharp note are obtained by the continuous depression of the same pedal. (86) Oscillations, multiplied by an arrangement of straight links connected with a common crank. (87) Alternate Intermittent Motion, produced

by link-work from a single axis of rotation. (88) Silent click, showing the method avoiding the noise and consequent wear of the clicks in ratchet work. (89) Variable work, showing a mode by which the path of a reciprocating piece may be increased or diminished or entirely suspended, without altering or stopping the prime mover. (90) Combination of Hook's joints in iron showing the effect of different inclinations of the axes, and supports for observing the relative velocities in each portion of the rotation. (91) A apparatus to demonstrate and illustrate the construction, pressures, and tensions of three legs or triangle, shears and derrick, also to show the amount of pressure distributed a given weight upon each of the three legs of a table. (92) Selection from complete mechanical apparatus for building up Experimental Machinery upon the plan described by the late Professor Willis in his 'System of Apparatus for the use of Lecturers and Experimenters in Mechanical Philosophy,' published by Weale, and largely illustrated by Professor R. S. LLD., F.R.S., in his 'Experimental Mechanics,' published by Macmillan & Co., 1871. The apparatus is strong; and actual machines of all descriptions, as clocks, mangles, crane, may be constructed of the parts, the latter being the combination exhibited. *Subject Applied Mechanics.*—(93) Sectional wooden model diagram of a corn-thrashing machine beaters, strawshaker, riddle, &c. (94) Sectional wooden model diagram of a winnowing machine for separating chaff, small seeds, and small grain from large grain. (95) Sectional wooden model diagram of a corn mill, including every process from the grain being put in hopper to its being deposited in sacks as fine flour, seconds, or bran. (96) Sectional wooden model diagram of a pump. (97) Sectional wooden model diagram of gas meter, size 1 ft. 4 in. (98) Sectional wooden model diagram of a door lock and key, showing the mode in which the various parts are arranged. (99) Working model of the action of a pianoforte, size 1 ft. by 1 ft. 3 in. *Subject XXII.—Steam.*—(100) Model of Bourdon's steam gauge. (101) Sectional Model of an express locomotive engine showing internal and external construction of boiler, tubes, smoke box, furnace, funnel, dome and safety valves, steam and exhaust passenger rods and handles, size 4 ft. 2 in. by 2 ft. 9 in. (102) Sectional wooden model diagram of an engine which can be placed before a class either as a horizontal, vertical, marine or locomotive engine. (103) Working illustration of link motion and reversing gear. (104) Sectional wooden model of compound steam engine, showing steam chests, valves, and steam pipe connections, and the manner in which steam enters the high pressure cylinder, and passes from the low pressure cylinder, and thence to the exhaust, size 2 ft. 6 in. by 1 ft. 3 in. (105) Sectional model of steam whistle alarm with lever bracket valve and float fixed on a part of boiler shell. 106 to 110 illustrations of parallel motions for various descriptions of engines. (Room No. 14).

157. **NATIONAL INDUSTRIAL HOME FOR CRIPPLED BOYS** (T. FRED. JOHN BOVIS, Resident Secretary), Wright's Lane, Kensington, London. The case exhibited by the above Institution contains a variety of specimens of work executed by the boys in the four trades' departments, viz. carpentering, relief stamping and plate printing, saddlery and harness work, and tailoring. Each workshop is supervised by a competent master, who instructs the boys in the handicrafts mentioned for seven hours. The boys, who vary in age from 12 to 18 years, choose one of these trades on entering the Home, and follow it for a term of three years, so that on leaving they can take situations as assistants or improvers, and thus are enabled to gain their own living. Hitherto the boys have been very successful in after life. The Home is national, and is the only one of the kind for crippled boys in the kingdom. It was established in 1865, and the Earl of Shaftesbury is President. The public can further the objects of the Home by giving orders to the respective trades' departments, as by this means the boys are instructed and encouraged to aid in their maintenance. Visitors are cordially invited to call at the Home and see the work carried on every day from 10 A.M. to 5 P.M. (Saturdays and Sundays excepted). (Room No. 14.)

158. **ST. JOHN'S INDUSTRIAL SCHOOLS**, Parsonstown, Ireland.—Mens of mosaic, needlework, &c.

159. **SCHOOL OF ART WOOD-CARVING**, Royal Albert Hall, Kensington, S.W., in connection with the City and Guilds of London Institute for the Advancement of Technical Teaching.—*Committee of Management.*—Colonel J. Donnelly, R.E., Chairman; The Right Hon. the Earl of Wharncliffe, Sir Coutts Lindsay, G. Aitchison, Esq., A.R.A., T. Armstrong, Esq., W. Chapman, Esq., J. H. Donaldson, R. W. Edis, Esq., F.S.A., G. Plucknett, Esq., J. H. Pollen, Esq., M.A., E. J. Poynter, Esq., J. Richards, Esq., E. C. Robins, Esq., W. F. Sawyer, Esq., J. Sparkes, Esq., H. T. Wood, Owen Roberts, Esq.; Treasurer and Hon. Secretary, T. Healey, Esq.; Manager, Miss Instructors, Messrs. W. T. Ross and W. H. Grimwood. The above school has been established with a view of encouraging the art of wood-carving in this country as a branch of the fine arts. Both day and evening classes are held in the School. The day classes are held from 10 to 12 days a week, and from 10 to 1 on Saturdays. The evening classes are held from 7 to 9 on evenings a week, viz., Monday, Tuesday, Thursday, and Friday. The fees for day students £2 a month, or £5 a quarter. The fees for evening students are 15s. a month, or £2 a quarter. These fees may be paid either at the Ticket Office, Royal Albert Hall, between the hours

10 A.M. and 5 P.M., or by P.O. Order addressed to the Hon. Secretary at the School, and payable at the Branch Office, Exhibition Road, South Kensington. There are at present twelve free studentships in the school, viz. six in the day classes and six in the evening classes, the fees for which are paid from funds supplied by the City and Guilds of London Institute for the advancement of Technical Education. The holders of these studentships are selected by the committee of the school from persons of the industrial class who are intending to earn their living by wood carving. Candidates must have passed the 2nd grade art examination of the Science and Art Department in freehand drawing at least. Those who have some knowledge of wood carving, or have passed in the other subjects of the 2nd grade art certificate, or in drawing from the antique and the figure, architectural drawing or designing, or in modelling, will be preferred. Applications for these studentships should be addressed to the Hon. Secretary at the School. The principal aim of this School is to cultivate the production of wood-carving in a broad style, and at a moderate rate, similar to that used so largely for decorative purposes in the 18th century in England, and the Committee would gladly co-operate with any architects for this purpose. Orders for wood carving are undertaken at the School and the students have just finished two carved lunettes for the architraves or over-doors of Lord Wharncliffe's billiard-room at Wortley Hall. A photograph of one of these will be found among the exhibits as well as a photograph of a carved oak mantel-piece executed in 1881 for the Drapers' Company. To meet a want largely felt in the country, a system of teaching by correspondence has been arranged by Miss Lowe (Manager) from the instruction given at the school by Signor Bulletti, who from 1879 to 1883 was instructor to the school. Each lesson includes a carved example, a block for copying the same, with diagram and instructions how to set to work. Examples may be seen in the Educational Case, No. 3. Terms £2 2s. a set of five lessons, 10s. 6d. a single lesson. Classes have also been started at Grassmere, Horsham, Fulborough and Ellesmere, and in Ireland at Dublin and Cork, by students who have been trained at the school.

The following is a list of the principal exhibits:—(1) Carved Piano Back, in Italian walnut. Panels and frieze designed by John Page. Centre panel designed by Maria E. Reeks. Panels and frieze carved by Mary S. Smith (age 20), and who joined the school in Nov. 1883. Capitals carved by M. E. Reeks. (2) A Small Cabinet in pearwood and American walnut, designed by W. Benson, Esq. Designs for panels and drawers by H. Sunner, Esq. The carving executed by Joseph Jounaux, Jennie C. Holt, Edward D. Lodge, Charles H. Walton. (3) Educational Case. A series of progressive lessons for the teaching of wood-carving as used in the school as well as for the lessons by correspondence. Arranged by Eleanor Rowe (manager); the example executed by the students, and the diagrams drawn by Margaret Reeks. (4) A Carved Walnut Panel of a child with birds and foliage. Executed by Maria E. Reeks, now assistant-teacher in the evening class. (5) A Carved Italian Pilaster in pearwood, by William Paige (age 19). (6) A Carved Griffin Panel in American walnut, by George Hurst (age 15). Joined the school in March, 1883. (7) A Gothic Panel in chestnut, executed by Louisa Spicer, for three months a pupil in the school. (8) A Gothic Panel in chestnut, executed by W. Beale. Joined the school in October, 1883. (Evening class.) (9) A Carved Panel in Italian walnut, by Donald Chisholm. Joined in May, 1883. (Evening class.) (10) A Carved Panel in American walnut, by A. Roberts. Joined in September, 1883. (Evening class.) (11) 18th century English Moulding for over door, executed by J. Jounaux. (12) Mouldings and Minor Panels. Further work of the School may be seen in the Art School section, arranged by the Science and Art Department in the International Health Exhibition. (Room No. 14.)

1520. CLERKENWELL TECHNICAL DRAWING SCHOOL.—The drawings for technical purposes should not be criticised by art connoisseurs, because they are only the ideas of workmen employed in one or the other trade, and if they fulfil what is wanted of them they are good. Such a drawing must show a correct outline of the article which it is to represent, and also the outlines of the ornaments, so that modeller, chaser or engraver is enabled to work, without guessing at the meaning of the designer, who is never asked to produce a picture. If he should do something in shading, in a Rembrandt style, his drawing would be useless in the workshop. The twelve drawings sent from the Clerkenwell Technical Drawing School, established by the Goldsmiths' Company for silversmiths, chasers and engravers, have little appearance of technical drawings, but everybody will observe that ornament, as the alphabet of every trade, forms the greater number of them, and that they are finished with great knowledge and care. The outlines are invented by the master of that Institution, and the students therefore had no copies, and were left to their own resources and forced to think for themselves. Also it will be observed that these drawings are shaded in one and the same way. The light falls from the left-hand side upper corner down to the right-hand side lower corner, and when the students have practised this for some time, they finish with greatest ease a good drawing, and have not to seek the help of a copy.—(Corridor 2nd Floor.)

1521. RANVIER, JULES, 116 Rue de Turenne, Paris.—Drawing Models in Zinc, largely used in the Higher Schools, Lycées and Colleges of France instead of plaster:—1. Collection of seven simple geometrical solids. 2. Collection of seven interpenetrative geometrical solids. 3. Collection of eight panels in two planes. 4. Series of thirteen examples of architectural, and other ornament; Gothic, Renaissance, &c. (Room No. 14.)

1522. UNIVERSITY COLLEGE, LONDON (ENGINEERING DEPARTMENT). University College, London, founded in 1828, very early recognised that applied science should take a place in its curricula, and the late Mr. Charles Blacker Vignoles (President, Inst. C.E.), was appointed in 1830 its first Professor of Engineering. Of late years it has very greatly extended its work in this direction, and has formed a Department of Applied Science and Technology, intended specially to provide systematic training for students wishing to devote themselves to Engineering, Architecture, Applied Chemistry in any of its branches, or any other manufacturing or commercial pursuit.

The education given in this department of the college is not intended to supersede such necessary practical training as can only be properly acquired in the workshop or factory. It is believed that, especially in the case of engineers, practical workshop and drawing office experience is an absolutely essential part of professional training. The sort of experience so gained cannot, it is thought, be obtained satisfactorily elsewhere than in places where the young men will see and take part in work done on a large scale, and under the pressure and all the other conditions of commercial life. No attempt is therefore made at University College to teach such work,—it is rather endeavoured to give those parts of preparation for a professional career which are complementary to, and cannot easily be obtained in, workshop and office training. This work includes, of course, lectures on Mathematics and Physics, on Mechanics and Graphical Statics, on Chemistry and Geology, on the Theory of Machines and Structures, the strength of Materials, the Steam Engine, &c., and instruction in drawing, geometrical and machine drawing, in graphical calculation and (so far as is possible) in the actual proportioning and design of structures and machines. Its special feature, however, is the instruction given in the Engineering Laboratory, which forms the subject of the present exhibit.

The Engineering Laboratory at University College, the first of its kind in this country, is based upon a scheme described in an introductory lecture to the Faculties of Arts, Law, and of Science in 1875. It was opened to students in 1878. Its essential objects may be summed up by saying that *it is intended to provide systematic instruction in the experimental methods which serve for determining the numerical data employed in engineering calculations, and also to familiarize students with the strength and other physical properties of the chief materials used in construction.* The importance of such instruction is twofold. In the first place, the exact value of any numerical results derived from experiment, and the limits within which they may be safely trusted, can be rightly estimated only by those who have some practical and personal acquaintance with experimental processes of the kind employed in obtaining these results. In the second place, engineers are continually called upon to deal with questions in regard to which some essential data are altogether wanting, and they are therefore very often compelled to make special experiments for their own guidance. In such cases the probability of their obtaining accurate and trustworthy results will be much greater if their previous training have made them practically acquainted with the art of experimenting and with the methods that had been successfully adopted by others in dealing with analogous questions.

The following is a summary of some of the chief heads under which work is now carried on in the Laboratory:—(1) Experiments on the deflection, extension, or compression of materials such as are commonly used in practical work, with determination of their limit of elasticity and ultimate resistance, and examination of the ways in which these are affected by the form of the material and the manner in which force is applied to it; (2) Experiments on steam-engine working, the relative economy of different steam pressures, different degrees of expansion, the use of steam jackets, the mechanical efficiency under different conditions, &c.; (3) Experiments on boiler working, consumption of fuel under different circumstances, &c.; (4) Experiments on friction; (5) Experiments on the use and accuracy of the apparatus commonly employed to measure force or work, dynamometers, brakes, indicators, &c.

The Laboratory contains a large testing machine capable of exerting a pressure of 100,000 pounds to test materials either in tension, compression, or bending, and having specially arranged appliances for making accurate measurements of extensions, deflections, &c.; a compound steam-engine working up to 20 Ind. H.P., specially arranged for experimental purposes, with measuring tanks, indicators, dynamo meters, &c.; a small engine, also arranged for testing: a vertical multitubular steam boiler: machine-tools (lathe, shaping machine, drilling machine, &c.); a tension testing machine, specially designed apparatus for conducting experiments of the kind just mentioned, as well as the necessary tools and appliances for working in wood and metal, preparing apparatus and specimens, along with standard measuring-apparatus.

The frame exhibited contains in the centre a plan of the laboratory, boiler-house, tank space, &c. Surrounding this are photographs of the exterior of University College, and of the interior of the laboratory, and smaller photographs of the testing machines, experimental engine, &c., and of the drawing room and laboratory with the students at work.—(Corridor 2nd Floor.)

1523. BRITANNIA COMPANY. Colchester.—Extra Strong Treble-Geared Lathe, as supplied to the British Navy. This lathe when driven by foot power will do the heaviest cuts with ease. It can be instantly altered to drive by either single, double or triple gear. It is especially adapted for those who have no steam power, and who require to take a heavy cut. These lathes are made in several sizes. The Lathe No. 15 is fitted with overhead motion and

division plate, and other appliances to any extent can be added. The No. 5 Lathe is fitted with a special appliance, by means of which screws can be cut to any thread. This can be fitted to any lock-gear'd lathe. Circular Saw Bench, fitted for either foot or steam power. The fret saws with vertical stroke and well-proportioned fly-wheels. The Screw-Cutting Lathe with 22 change wheels.—(Workshop.)

1524. MELHUISH & SONS, 85 & 87 Fetter Lane, Holborn Circus, E.C.—Amateur's Lathe for wood or metal, with adjustable chucks, and turning tools. Screw-cutting Lathe, complete with tools. Boys' Foot-power Machines for fret-work. Joiners' and Cabinet Makers' Tools. Various Tools for Carvers. Engravers' Tools.—(Workshop.)

1525. EVANS, JOHN HENRY, 159 Wardour Street, Soho.—Four Lathes. One self-acting slide and screw-cutting Lathe. One Lathe, with fittings for ornamental turning. Two smaller Lathes for ordinary technical school purposes. Tools, &c.—(Workshop.)

1526. HOLTZAPFFEL & CO., 84 Charing Cross, S.W.—Lathes and Tools for plain turning and screw cutting. Lathes for ornamental and decorative fine art turning. Tools employed for accuracy and various purposes in the constructive arts.—(Workshop.)

1527. SYER, THOMAS J., 1 Finsbury Street, Chiswell Street, E.C.—One College or School Workshop Bench, fitted for four pupils, but capable of working six. Supported on metal standards and fitted with four patent instantaneous grip-irons. Bench-knives, Hold-hats, Mitre Machine, Engineer's Vice Lathe, Sundry Tools.—(Workshop.)

1528. TECHNICAL SCHOOL, University College, Nottingham.—(1) S-roll Step. (2) Blocked Well Hole for Staircase, showing method of construction. (3) Hand Rail, for Well Hole Staircase. (4) Block illustrating the first lesson in the tangent method of describing hand-rail ramps and wreaths. Method of determining and applying bevels. (5) Construction for obtaining the Face Moulds and Bevels for a semi-circular Doorhead, in a circular turret. "Circle on Circle." (6) Scroll Termination to Hand-Rail, showing the method of describing the mould for the shank. (7) Panel and Hand-Rail for Staircase, $\frac{1}{2}$ scale. Constructed by G. Richardson. (8) Patterns, Core Boxes, &c., for 2½ H.P. Cylinder. (9) Newel Staircase, $\frac{1}{2}$ scale. (10) Plank for Ramp and Wreath, showing application of face moulds. (11) Scribing Block. (12) Plan of Workshops, University College, Nottingham. (13) Photograph of University College, Nottingham. (14) Model of Queen Post Roof for Engine House, intended for raising heavy weights from the Tie Beams. Constructed by evening students. (15) Method of describing Face Mould, Tangents, Butt Joints and Bevels for Hand-Rail to Stairs, with one riser in centre of Well. The application of the face moulds to the plank is shown separately. Models for Mechanical Drawing Class. (Room No. 14.)

1529. HANNIBAL, A., Instructor of the Technical Class for Boot and Shoemakers at the Polytechnic Institute.—Models and Diagrams. (1) Showing the normal condition of a healthy foot. (2) The anatomical arrangement of the above. (3) Showing the points of measurement for cutting what is called long work, or thigh boots. (4) Showing the inner side, or arched waist of the foot. (5) The outside of the foot and division of the different classes of bones. (6) Showing a geometrical method for shaping the sole part of the lasts or models. (7) The method of gauging patterns into sets.

The instruction in this class comprises the physiological construction of the human foot, its power, functions, and natural requirements. The correct points at which measurements should be taken up, and the shaping and fitting up of lasts and models suitable thereto, in single pairs and sets of various sizes and widths. The art of cutting patterns of various kinds suitable for single pairs, and gauging the same by geometrical rule into sets of the various lengths and widths required. The selection of material most suitable for the various classes of work. Division of the various kinds of skins into sections showing how they should be cut to ensure economy and durability. The art of (what is technically called) stocking the work as it is being cut, so as to ascertain the exact cost of any particular pair of boots or shoes. The theory of fitting the different pairs together, so as to complete the top part of the boot or shoe, exactly adapted to the models upon which they are to be made. (Room No. 14.)

1530. CITY AND GUILDS OF LONDON INSTITUTE, TECHNICAL COLLEGE, Finsbury.—Specimens of Apparatus used in the Electrical Engineering and Applied Physics Laboratories (W. E. AYTON, F.R.S., Professor).—The main object of the course of instruction is to train students in the application of the laws of physics to industry, and to lead them to see how such an application can be used to improve and cheapen industrial operations. The instruction is analytical rather than synthetical. The student's attention is first directed to a complete apparatus or machine; its action and the practical results obtained with it are then considered; and, finally, the scientific principles that underlie its correct working are evolved. The education is given partly by lectures, but mainly through the laboratory work of the students themselves. The laboratory contains many arrangements of apparatus for an organised series of experiments, each set complete in itself, so that the students will find ready in position all the apparatus necessary for carrying out seriatim a large number of experiments. Full printed instructions are appended to each experiment, and copies are supplied to the students. The students work in the laboratory in groups of three, these groups

being arranged so that students whose knowledge is about the same work together. The experiments are performed as nearly as possible in a specified order; and before a group of students is allowed to pass on to a new experiment, each member is required to show to the professor, or one of the demonstrators, his written-out notes of the previous experiment, including any deductions he may have made from it. After any student has completed all these experiments in the regular course, he is set to carry out what may be called scientific commercial experiments—that is, the kind of experiments a Master of a Works might arrange to have undertaken, to enable him, by the application of the principles of science to his trade, to turn out the articles he manufactures in the best and cheapest form. The special industries in connection with which Applied Physics is at present taught at the Finsbury Technical College are those involving the use of electricity or heat, and the accompanying are specimens of the instructions attached to the experiments in the various Laboratories for these two subjects. Those of the instructions marked with a cross refer to the apparatus which is on exhibit at the Health Exhibition.

Mechanical Department (JOHN PERRY, M.E., Professor).—Mechanical Laboratory.—Specimens illustrating course of instruction in the workshop for all students of the college. In every case the student is expected to give the result of his investigation in the shortest form. The observations which have led to this result must be arranged in tables. Sheets of squared paper must contain such necessary information as will enable the curves drawn upon them to be understood.

Chemical Department (H. E. ARMSTRONG, Ph.D., F.R.S., Professor).—Apparatus illustrative of the course of practical instruction in chemistry.

Applied Art Department (A. F. BROPHY, Esq., Headmaster).—Drawings and Designs for Applied Art Work, Models from Casts and from Life, Designs for Tapestry, Painting on Silk, Needlework, &c.

MODELS IN WOOD, ILLUSTRATING THE PRINCIPLES OF CARPENTRY AND JOINERY. BY H. STAYNES, INSTRUCTOR IN CARPENTRY AND JOINERY.—(1) Model of an Elliptical-headed Frame, to be placed in a circular wall, with linings and soffit splayed all round. The method employed for the soffit is original; in the opinion of the exhibitor the works on carpentry and joinery that mention this subject describe it upon wrong principles. (2) Model of Raking Mouldings. The method employed is original. Any case can be worked by it. In the case taken the plan of the mouldings makes an angle of 120°; one piece of moulding is inclined 24°, and the other 14°. (3) Small Model Pentagonal Roof, with the five hip-rafters cutting against a triangular prism. This is intended as an exercise to perfect students in cutting oblique timbers against vertical planes and angles. The principles employed in this are essential to a sound knowledge of cuts and bevels generally. (4) Triangular Piece of Work with the side A inclined 60°, the side B inclined 30°, and cut against side A, the side C vertical and cut against A and B. This is intended as an exercise in producing bevels required for butt joints. (5) Model with mitred angles, one angle acute, one obtuse, and one square. This is intended as an exercise on inclined mitred work. (6) Hand-railing. Shows the application of the face mould and bevels, squaring the wreath, &c. (7) Small Model of Squared Hand-rail. (8) Model showing angle brackets, for internal and external angles. (9) Intersection of Mouldings (hollow mitres). (10) (a, b, c) Method of placing all bevel lines direct upon the hip-rafters, jack-rafters, and purlins without making a drawing of the same. This method is original. It is simple and expeditious in its application for bevels generally.

MODELS ILLUSTRATING METAL PLATE WORK (PATTERN CUTTING). BY C. T. Millis.—The models have been made by students as part of their work in the class for metal plate work, which is useful to those engaged in its various branches, as coppersmiths, zinc, tin, and iron-plate workers, &c.

The instruction in the class include the application to Pattern Cutting (i.e., development of surfaces) of problems in plane and solid geometry; such as the true shape of sections, and development of sectioned solids adapted to the wants of sheet-metal workers, and required in the construction of elbow, cowl, vase, bath, and other patterns. Attention is given to the practice of the trade with regard to the arrangement of joints or seams to suit the sizes of sheet metal which have to be used.

The students first draw the patterns on paper, and then make models (as shown in the exhibit) to illustrate the use and position of the lines used in their construction, and to test the accuracy of their drawing. Another part of the instruction in this class consists of lectures and experiments, where possible, on the composition of solders and other alloys, theory and practice of soldering; the physical properties of the metals in their manufactured condition with regard to malleability, annealing, &c., for hollowing and raising purposes. The action of air, water, and acids on the metals is also considered.

The patterns for some of the models have been constructed on a new system devised by the exhibitor, which makes the study of pattern cutting much easier by doing away with special methods for each case, and substituting principles on which the construction of most of the patterns needed by workers in sheet metal can be based. A description of this system will be shortly published.

MODELS AND DRAWINGS OF BRICKWORK. EXHIBITED BY J. CHANNON, INSTRUCTOR OF THE *BRICKLAYING AND BRICKCUTTING CLASS.*—Detailed drawings of gauged brick arches, with sections showing the bond.

These drawings are fair specimens of work executed by the students in their first year course. In connection with drawings of this description (which are usually full size), the students receive instruction as to the methods adopted in the actual work, i.e., the system of gauging and moulding the bricks, how to distinguish between good and bad materials, also good and bad work, the methods of obtaining the joints and bevels, the application of moulds and templets, and where necessary, in order to thoroughly understand the application, the students execute a portion of the designs.

CLASS LI.

Science Teaching.—(a) Apparatus and Models for Elementary Science Instruction in Schools; Apparatus for Chemistry, Physics, Mechanics, &c.; (b) Diagrams, Copies, Text-books, &c.; (c) Specimens of the School Work in these subjects; (d) School Museums.

1531. E. C. ROBINS, F.S.A., 14 John Street, Adelphi.—Some prefatory remarks are due to this series of illustrations of the fittings required for applied science Educational Buildings. The drawings themselves are selected from a series specially prepared by Mr. Robins, to illustrate a course of lectures delivered by him at the Royal Institute of British Architects, which were published by that body in its Transactions for the years 1883-84, and are obtainable there. (1) "On the Buildings required for Applied Art and Science Instruction." (2) On the fittings required for the above. (3) On the Ventilation and Warming of such Buildings. (4) The above papers were preceded by a lecture delivered at the Society of Arts in 1882, and published in the journal of the Society "On English and Foreign Technical Education." (5) The same subject was also discussed by Mr. Robins in a paper "On Secondary School Buildings," delivered at the Society of Arts in 1880, and published in the journal. The provocative cause, however, of the production of these papers (which are mentioned here to enable students to see them, since they have not as yet been published collectively) was the foundation of the City and Guilds Institute for the advancement of Technical Education, some five or six years ago. As a representative of one of the contributing Guilds, Mr. Robins became a Member of the Executive Committee of the Institute, and in that capacity accompanied Professors Armstrong and Ayrton to Germany, who had been commissioned to inspect and to report on the latest buildings and fittings of the Science and Art Schools of that country and Switzerland, Bavaria and Austria. The papers before mentioned were the result of this experience, coupled with a tour in the English provinces; and the fittings of the Technical College, Finsbury, designed by Messrs. Armstrong and Ayrton, on their return from the above tour, are among the latest executed examples. A fitter time than the present could not have been selected by the City Companies for the inauguration of the great work they have set on foot, the crowning effort of which is represented by the noble building in which these drawings hang, a good portion of which having been lent to the Executive of the International Health Exhibition, to give a fuller development to the educational side of the question, and the efforts made to ensure healthful laboratories. The appointment of the Royal Commission on Technical Education quickly followed upon the establishment of the Institute, and the result has been a general awakening to the fact that the maintenance of our pre-eminence as a practically technical nation, will in future very much depend on the possession of educational advantages equivalent to those which are already common upon the continent, and which happily are yearly growing in number and importance here, but are comparatively a new departure in this country. The popularization of applied science teaching has been one of many good results of the work done and still doing by the authorities of South Kensington, and its grants in aid upon the results obtained, coupled with the technical examinations inaugurated by the Society of Arts (now carried on with increasing success by the City Guilds), have been the means of inducing considerable attention to be given to the scientific principles underlying the various industries of the country. Reading from left to right the drawings exhibit, 1. Dr. Armstrong's working bench for chemical students, which has the merit of requiring all operations evolving odours of any kind to be done upon a shelf under a continuous hood from which the fumes are extracted by down-cast shafts in the manner indicated. The lead-covered table top has no basins, but a sink is provided at each end. This is the system adopted at Finsbury Technical College. 2. Perspective sketches of the Sulphuretted Hydrogen Closets in use at Graz in Austria, and at Leipsic in Germany, showing the vertical draught slits at back. 3. Dr. Hofman's laboratory draught closet, designed for the chemical laboratory at Bonn and Berlin, and since very generally adopted. 4. Professor Roscoe's working bench for chemical students, in use at Owen's College, Manchester. In this example basins and fume closets are provided for each pair of pupils in the oak topped tables. 5. Dr. Armstrong's private laboratory draught closet, for Finsbury, showing a continuous horizontal draught slit at back in connection with the extract flues aspirated by gas jets. 6. This group of four drawings show the basement, ground, and first-floor plans and sections of Professor Baeyer's chemical laboratory at Munich, one of the best of foreign examples. 7. The glazed drawing in the centre is a view of the Merchant Venturers' School, at Bristol, in course of erection by Mr. Robins, and under it is a plan of the 2nd or Chemical, Physical and Metallurgical laboratory floor. 8. Dr. Thorpe's arrangement for the fittings of the Yorkshire College, Leeds, showing draught and evaporating closets, sulphuretted hydrogen closets, &c., &c. 9. Perspective view of a student.

working bench, from the laboratory at Leipsic. 10. Ground plan of the new chemical laboratory at Dundee. 11. Plan of the physical laboratory at Japan. 12. The first and second floor plans of the Finsbury Technical College, showing the fittings in situ. (Corridor 2nd Floor.)

ALLAN GLEN'S INSTITUTION, Glasgow. (See Classes 50 & 53.)

OLDHAM SCHOOL OF SCIENCE & ART (J. P. PYTHIAN & JOHN ROBERTSON). (See Classes 50 & 53.)

RIGG, JAMES, 11 Queen Victoria Street, E.C.—Apparatus illustrating theoretical mechanics. (See Classes 50 & 53.)

SHEFFIELD SCHOOL BOARD CENTRAL SCHOOLS. (See Classes 50 & 53.)

TECHNICAL SCHOOL, Manchester (J. H. REYNOLDS, Secretary). (See Classes 50 & 53.)

CLASS LIII.

Art Teaching.—(a) Apparatus, Models, and Fittings for Elementary Art Instruction in Schools; (b) Diagrams, Copies, Text-Books, &c.; (c) Specimens of Art Work, Modelling, &c., in Schools.

1532. ART FOR SCHOOLS ASSOCIATION (Hon. Sec. MISS M. E. CHRISTIE)

29 Queen Street, Bloomsbury, W.C.—The object of this Association, founded in July 1883, is to place before boys and girls, in board and other elementary schools, works of art selected upon some definite principles, to accustom children from their earliest years to the knowledge of what is really beautiful, and to inculcate indirectly a love of both nature and art. With this view the committee have endeavoured to form a standard collection of examples from which the groups exhibited have been selected. This collection (of which a complete catalogue is published and may be had on application) comprises—(1) Pictures of the simplest natural objects, e.g. birds and their eggs and nests, trees, wild flowers, scenes of rural life, such as town children seldom see, and country children often fail to enjoy. (Two drawings, "The Sunflower" and "The Foxglove," belonging to this division, exhibited in Group B, have been reproduced by Mr. W. Griggs from prize drawings at the South Kensington School of Art, and are published by the Committee of the Manchester Art Museum and the Art for Schools Association, price 2s. 6d. to the public, and 1s. to schools.) (2) Pictures of animals as aids to instruction in natural history, also in relation to mankind, especially to children. (3) Pictures of peasant and artizan life, incidents of heroic fiction, illustrations of popular legends and household stories. (4) Pictures of buildings of historic interest, and artistic excellence. (5) Landscapes and sea-pieces, especially illustrations of daily life in the fields or on the sea. (6) Historical portraits, and episodes from history. (7) Reproductions wherever available at a reasonable cost of the works of the great masters of our own and foreign countries. In the course of last winter the Art for Schools Association invited the managers of Elementary Schools throughout the country and others interested in the question to a preliminary exhibition of their selected works. A steady and continuous demand for the works has followed, and the Committee are encouraged to believe that they are endeavouring to supply a want which is becoming more and more widely felt. The support given to the Association by the principal print publishers of London has enabled the Committee to offer the various groups to school managers on very advantageous terms. The Association proposes, moreover, when its funds permit, to arrange loan collections of pictures which will be circulated among such schools as are unable to bear the cost of purchase. The President of the Association is Professor Ruskin, and among the Vice-Presidents are the Right Hon. A. J. Mundella, M.P. (Vice-President of the Council on Education), Right Hon. W. E. Forster, M.P., Sir Frederick Leighton, P.R.A., Mr. Matthew Arnold, Mr. Robert Browning, &c., &c. (Corridor Ground Floor.)

SCHOOL OF ART WOOD-CARVING, Royal Albert Hall, S.W.—See Classes 50 & 53.)

TECHNICAL SCHOOL, Manchester (J. H. REYNOLDS, Secretary).—(See Classes 50 & 53.)

CLASS LIV.

Schools for the Blind and for the Deaf and Dumb.—(a) Apparatus and Examples for Teaching; (b) Specimens of School Work.

1534. SOCIETY FOR TRAINING TEACHERS OF THE DEAF, AND DIFFUSION OF THE "GERMAN" SYSTEM IN THE UNITED KINGDOM, 298 Regent Street, Portland Place, W. (Major-General F. C. COTTON, C.S.I., Chairman.)—The Education of the Deaf and Dumb is, at the present time, undergoing, in many countries, changes and developments so important that they constitute a veritable revolution. However wonderful it may appear to the ordinary public mind, the dumbness is now in fact removed which has so generally been associated with deafness, as represented in the common but most unfortunate and misleading term—"Deaf and Dumb."

The art of instructing the Deaf has a history of its own, singular if not unique. It has been discovered and lost, rediscovered and again lost, in different ages, different countries, and by men acting not only independently of each other, but in entire ignorance of each other's existence.

Though Christianity, soon after its establishment, began to surprise and bless mankind with works of benevolence and philanthropy which had never been seen before, it did nothing for the "Deaf and Dumb." Its Divine Founder performed one of His first and most striking miracles on the man "who was deaf and had an impediment in his speech;" but the far more common Oriental affliction of blindness engrossed, as it still does, a very much larger share of notice and sympathy; and for many centuries of the Christian era the Deaf and Dumb were as much overlooked and neglected as they had ever been in the darkest times and countries of Heathendom.

Allusion to them and to their condition is rare and exceptional; and, viewed as we now view the subject, all such allusions seem irrational and absurd. To this extent, the Deaf may be said to have attracted some attention, but certainly they received no help. We find that they were occasionally referred to in the Old Testament; and in the New Testament we read of the sublime miracles by which "the Deaf" were made "to hear and the Dumb to speak." Among classic authorities they were mentioned by Aristotle, legislated for by Justinian, and dismissed in a couplet by Lucretius. The first Christian writer who speaks of them is St. Augustine, and after him the Venerable Bede, who relates how St. John of Beverley, Bishop of Hexham, brought a deaf man "to speak and declare his secret thoughts and purposes, which before that day he could never utter to any man." This was associated so immediately with miraculous power, that at this distance of time we cannot correctly ascertain the real facts of the case. After this, eight centuries elapse before there is any further record of the teaching of a deaf-mute. It is found in a work entitled "*De Instructione Dialectica*," by Rodolphus Agricola, born at Groningen in the year 1442. A century later Jerome Carden, an Italian, writing on the condition of the Deaf, pronounced their instruction, though "doubtless difficult, still to be possible;" and that it was possible was satisfactorily proved by a contemporary of his own, Pedro Ponce, a Benedictine monk of Oña in Spain. Ponce taught, and taught successfully, but he left no record of his work; and when he died, in 1584, his knowledge and experience died with him. Nearly forty years afterwards another Spaniard, Juan Paulo Bonet, taught a deaf fellow-countryman of high rank; but he did more, he wrote upon the subject also. His book, still extant, is the first formal essay on the instruction of the Deaf which was ever printed. It was published in 1620. From this time there was an occasional awakening of the attention of intellectual men, not only to the importance of the subject, but to the practicability of instructing those who were without the sense of hearing. Yet alike in Italy, in Germany, in France, and here in England, the same story might be repeated, in regard to any progress made. It is a history telling of speculations and experiments, of the doubts of some and the wonderment of others, followed by the entire decay of all interest in the subject until the early part of the eighteenth century. Again the same phenomenal incident occurred. Three men, in different countries, took up the same subject in a practical manner, and, employing different systems, found their way to successful results of different character and degree, without, as already mentioned, the knowledge of each other's existence. Thomas Braidwood in this country, Samuel Heinicke in Germany, and Charles Michel de l'Epée, in France, commenced that work among the deaf children of their own countrymen which led to the permanent establishment of schools, each on his own system, first of all in their own countries, and then in others which were quick to note their proceedings and to follow their example.

At the beginning of the present century there was but one such public institution, very small and only just established, throughout the British Empire. Half a century ago the number had only increased to ten. At the present time there are in the United Kingdom about fifty, and they contain about 2700 pupils. This is a total twice as large as that of thirty years ago, and yet it is wholly inadequate, for it is held that there should be now at school 4000 pupils at the least. Of the ten Institutions existing in Great Britain 50 years ago, there was on the eastern side of England, between the Thames and the Tweed only one. There are now eight. The distribution of small schools throughout the country, by the operations of School Boards and through local effort, will do much to make education more accessible, by removing the obstacles of distance from home, expense, and delay in waiting for periodical elections. A further proof of that want of interest in this subject, which so long prevailed, is furnished by the fact that no Census of our deaf population was ever taken in this country until 1851. The returns of the Fourth Census, that of 1881, have lately been made public.

When it is considered that only within the period indicated has the education of the Deaf come under public notice at all,—that for not more than half a century has it been known beyond the circle of those immediately connected with it, and that even now the general ignorance upon the subject is lamentably great,—there are still undoubted signs of progress, very encouraging to those who have the welfare of this most interesting class so much at heart.

It is computed that the number of persons Deaf and Dumb, of all ages, throughout the world, exceeds *one million*. Taking the proportion as one in every 1500 of the world's population, the number has been given as 1,082,132. Excluding, as we must do, all uncivilized countries, remembering that the education of this class is the product of Christianity and civilization, and is almost entirely confined to Europe, America, and a few British colonies

and dependencies abroad, it is no wonder that while the approximate number of deaf children of school age would, on this reckoning, be 180,000, the highest tables which have been recorded, place the total on the school register below 30,000. The countries in which more than 1000 pupils are at school are:—Austria-Hungary, with 1300; Italy, with 1500; Great Britain, with 2700; France, with nearly 4000; Germany, with nearly 6000, and the United States with a total of more than 7000.

The three men already named—Heinicke, De l'Epée, and Braidwood, were spared to continue their work, and see it so firmly established in their respective countries, that it has been carried on uninterruptedly ever since. Heinicke used speech as the vehicle of instruction. De l'Epée used signs and the one-handed alphabet. Braidwood taught articulation, but employed signs and the two-handed alphabet as his medium of teaching. Thus the title of the German (but recently the Pure Oral) system is used to describe the method of Heinicke, the French system that of De l'Epée, and the combined system that of Braidwood.

Until about twenty years ago the German system was almost exclusively confined to Germany and Holland. Its introduction to public notice in this country took place in 1867, and is chiefly due to the late Baroness Meyer de Rothschild.

In 1872-3 an English lady and gentleman, with a view to ascertain the best possible mode of education for their deaf daughter, devoted themselves for the better part of those two years to a painstaking investigation into the methods and practice of educating the Deaf, not only in Great Britain and the principal countries of Europe, but in the United States and Canada. They were led to the following conclusions:

(a) That the German system was the best for the education of all deaf children, especially for the poor.

(b) That it was the best for the education of their own child.

(c) That to establish this system, and to raise the education of the Deaf to proper efficiency and importance, a Training College for Teachers was a necessity.

In 1877 action was taken on these conclusions. The society was started whose title heads this notice, which, in the following year, was able to open the training college at Ealing. The Society will exhibit here in Group 6, Class 54, No. 1534, a school at work, where practical illustration will be given of the method of teaching. This, in conjunction with kindred societies, it is intended to do frequently, and, if possible, daily. In the year last named, 1877, a conference of head masters of institutions and others interested in the Deaf was held, in which the various systems were represented and discussed, and the movement in favour of the German system received an impetus of which the results were soon apparent and are in operation still. In 1880, there was held at Milan a great International Congress, in which almost every country, with the very remarkable exception of Germany itself, was conspicuously represented; and there, in an assembly of over 160 experts, it was resolved, with only four dissentients, that "the Pure Oral method ought to be preferred to that of signs for the education of the Deaf and Dumb." From this time the advance of the Pure Oral system has been rapid and continuous. Out of 500 institutions now in operation, in various parts of the world, this system, which makes speech the basis of all education, is adopted and employed in by far the large majority of them. Of the remainder, a considerable proportion are on the combined system, while a small number still retain the manual or sign system, pure and simple. In fact, the Pure Oral system is the one in actual practice in all the schools of some countries, in nearly all those of other countries, and in a continually increasing number in every country where the deaf are taught at all.

From these facts, and from what will be seen in the Exhibition, visitors will be able to appreciate the statement in the General Official Catalogue (pages 123, 124). "The education of deaf mutes is of more modern growth, and has been attended by a success which may be pronounced truly marvellous. Until recent years it was considered useless to attempt to teach those to speak who were born deaf; but this apparently impossible feat is now successfully accomplished. Not only this, but deaf children can be taught to understand what is said to them by following the movement of the lips and the facial expression. To such great perfection has this special branch of education been carried, that in some cases deaf persons can carry on a conversation with those they know, so that a stranger would not perceive their infirmity." (Room No. 2.)

1535. ASSOCIATION FOR THE ORAL INSTRUCTION OF THE DEAF AND DUMB. Under the Patronage of Their Royal Highnesses the Prince and Princess of Wales. President, the Earl Granville, K.G. Director, William Van Praagh, Esq. School and Training College for Teachers, 11 Fitzroy Square, W.—The Association for the Oral Instruction of the Deaf and Dumb was founded in 1871. Its chief objects are, 1st. To propagate in this kingdom the pure oral instruction of the deaf and dumb, which means to teach them to talk, and to enable them to receive instruction by means of spoken language only, to the rigid exclusion of the finger alphabet and all artificial signs. 2nd. To train hearing persons to become qualified teachers on this system, and to find employment for them either in schools or in private families. 3rd. To maintain a normal school for the instruction of deaf children of all ranks and creeds.

The exhibits of the Association consist of materials and manuals used in teaching, a time table for the use of deaf and dumb schools during the whole course of instruction, an illustrated almanack or season table, and a numerical table for the use of deaf and dumb children, which is also adapted for blind children, and papers on the education of the deaf and dumb.

A few words in explanation of the system publicly introduced by the Association: The affliction of dumbness does not exist among the so-called deaf and dumb, who are merely those who have been either born deaf or have become so after birth through illness. Not being able to hear, they are naturally unable to imitate speech, and consequently remain dumb. The faculty of hearing finds a substitute in that of sight. This method of artificial hearing (lip reading) is the principal object in the tuition of the deaf child, who is made to understand what is said by carefully watching the movements of the speaker's face. In teaching the child to speak, the teacher follows the same natural method instinctively adopted by the mother in the instance of a hearing child. Instead of making the pupil hear the sound, the teacher makes him observe the movements which are produced on the face by speaking the word, and teaches him to associate the facial movement with the object alluded to.

The child is first instructed to breathe properly, and to notice the difference between inhaling and exhaling. Then vowel sounds are taught, after those consonants; the vowel sounds and consonants can then be combined so as to form words; the meaning of the words is illustrated by showing the objects themselves, or pictures of them.

The following process takes place:—

The teacher pronounces a sound, the child imitates it (speaks), and learns to recognise it when spoken (lip reads), he also associates the sound with the letters (reads), and imitates them on the blackboard, the slate or paper (writes).

Now the words can be extended to simple sentences, the simple sentences to compound ones, and so on, slowly, by easy steps, to more advanced lessons, until the pupil is able to receive instruction by spoken language and lip reading in all the branches of a sound English education.

Any attempt to combine this system with others would produce unsatisfactory results.

A public lesson is given on Wednesday afternoons at 3 o'clock punctually at 11 Fitzroy Square, when the work in all its stages can be seen. The history of the introduction and progress of the Pure Oral or German system is contained in the Report of the Association for 1883, which, together with other papers on the subject can be had free, on application to either the Secretary or the Director, 11 Fitzroy Square, W.—WILLIAM VAN PRAAGH, Director. (Room, No. 10.)

1536. JEWS' DEAF AND DUMB HOME (THE) (S. SCHÖNTHEIL, Principal), Walmer Road, Notting Hill, W.—The object of the Exhibitor is to show how far he has succeeded with his pupils taught on the pure oral system under circumstances anything but favourable, in enabling them to lip-read, to articulate, to use the vernacular of their country fairly correctly and fluently, and to acquire such an amount of general knowledge, as will render it possible for them to continue their education, by books and conversation. The pure oral method of teaching the deaf and dumb is based on the recognition of the true state of this afflicted class of humanity. The real affliction is deafness, and mutism is only its necessary consequence; the organs of speech of the deaf and dumb are perfectly intact, and their intellect varies in the same degree as that of normal children. The want of this knowledge, or rather the misconception on this point, prevailing not only in the classical, the middle, and even to some extent in the modern age, called into existence the systems known as the mimic, sign, or gesture, the manual, and the mixed system. Clear-sighted men of various lands and different times such as Pedro de Ponce, Bonet, Wallis, Braidwood, Amman, Van Helmont, Pareira, and last but not least Heinicke, knew and made known the real condition of the deaf and dumb, and preached, as well as practised, the pure oral method: but, as the great Schiller says, "Gegen Dummköpfen Götter selbst vergebens," their voices proved too weak, because their times were hard of hearing, and the recognition that the pure oral method is best suited to restore the deaf and dumb to their birthright as men, by bestowing on them that particular gift which distinguishes man from the lower animal, is an achievement of comparatively recent date. Here the names of Hill, Arnold, Rössler, and others, equally able and zealous, deserve mention. Lip-reading means the ability of understanding the articulate utterances of others by watching the various movements of the organs of speech by which articulated words are moulded into being. This ability is the very backbone of the pure oral system, and by the higher or lower degree of its development this (system) stands or falls; for fluent lip-reading is conditional upon an articulation in strict accordance with the laws of physiology of speech, and renders communication with the outer world easy and agreeable. This, again, in its turn, greatly facilitates the acquisition of idiomatic language, which opens to the deaf and dumb not only the many and perpetual sources of living intercourse with the human intellect, but also uncloses to them the rich stores of literature, and thus renders their education a sure success. The advantages accruing from the pure oral method to the physical welfare of the deaf and dumb are equally great. The habit of watching the slight movements of the organs of speech, or the constant hanging on the lips of others, so to speak, gives the eye that vivacity and lustre which are

conspicuously wanting in the deaf and dumb taught on the other systems. The more active process of inhalation and exhalation, consequent upon articulate speech, not only materially strengthens the respiratory organs, but at the same time tends to invigorate the whole body. And the statistics, which show that the death-rate among the deaf and dumb who had no teaching at all or had been taught on the silent system is much higher than among their more fortunate fellow-sufferers taught on the pure oral method, conclusively point to the fact, that articulated speech cannot be dispensed with with impunity, and that silence (in a measure) means death. A great deal more might be adduced in favour of the pure oral method. This is, however, rendered unnecessary by the gratifying fact that, since the Milan International Congress of Headmasters of the Deaf and Dumb Schools (1881), this method has passed the stage of disputation and entered upon that of demonstration. (Room No. 10.)

1537. DEAF AND DUMB SCHOOLS (THE), Old Trafford, Manchester (W. S. BESSANT, Secretary).—(1) Specimens of School Work, Language Lessons, Drawing, &c. (2) Specimens of Handicraft by old pupils of the Institution. (3) Time-table Pictures. (Room No. 10.)

1538. L'ISTITUTO SORDOMUTI, Bologna (CESARE GUALANDI Director).—(1) Method of teaching people born deaf, and deaf mutes. (2) Specimen of their work. (Room No. 10.)

1539. BRITISH ASYLUM FOR DEAF AND DUMB FEMALES (THE), Lower Clapton.—The British Asylum for Deaf and Dumb Females, of which their Royal Highnesses the Prince and Princess of Wales and other members of the Royal Family are Patrons, was instituted in 1851, and is certified under 25 & 26 Vict. c. 43. The Institution is for adults. Its object is threefold, namely (a) To educate or continue the education (secular and religious) of female deaf-mutes. (b) To give manual and technical training, with a view to enable the deaf-mute to earn an honest and independent livelihood. (c) To provide an asylum or home for the aged and helpless. The exhibits will show some results of the educational and manual instruction which has been found practicable in the case of those admitted; many of whom had been utterly neglected and untaught. The oral or German system of instruction, not being found practicable in the case of adults untaught when young, the sign and finger method of instruction has been in most cases the only possible means of education. Some of the inmates, who are not congenital deaf-mutes, are able to articulate words and short sentences. Amongst the specimens of work exhibited will be found knitting by two aged *blind* deaf-mutes; handwriting—arithmetic—and English composition, by inmates who entered the asylum at an advanced age, and were, till admitted, quite ignorant and uneducated. Good specimens of laundry-work and needlework of all kinds are amongst the exhibits. Secretary, W. T. Hillyer. Office: 27 Red Lion Square, W.C. (Room No. 10.)

1540. DEAF AND DUMB ASYLUM, Old Kent Road, London, and at Margate. (Established 1792.) For the maintenance, education and clothing of indigent Deaf and Dumb children. Patron: HIS ROYAL HIGHNESS THE PRINCE OF WALES, K.G.

The asylum was first established in Bermondsey. In 1807 a permanent building was founded in the Old Kent Road. In 1875 a branch asylum was opened at Margate by the Prince and Princess of Wales. In 1880 such branch was enlarged to accommodate 350 children. The system of instruction adopted up to the year 1881 in this institution was that known as the "combined," since which date a separate and distinct "oral establishment" has been added, which is at present being conducted at St. Lawrence, Ramsgate. 4652 children have received the benefits of the institution; 1807 children have been apprenticed to various trades at a cost to the charity of £16,936 14s. 6d.

The exhibit represents some of the work done in school by the afflicted inmates of the asylum. Treasurer, Charles Few, Esq.; Secretary, W. H. Warwick. Offices: 93, Cannon Street, London. (Room No. 10.)

1541. YORKSHIRE INSTITUTION FOR THE DEAF AND DUMB, DONCASTER.—In the education of the deaf the acquisition of language is the chief aim. This cannot be achieved without example and illustration, in the giving of which much information may be directly and indirectly conveyed. The vast ground, however, that has to be traversed by a teacher of the deaf, precludes him from placing his pupils in the same category as speaking children, but when once they are able to think, the work accomplished is thorough and lasting.

In the above institution the whole of the educational efforts are directed to careful development of the intelligence, and the cultivation of habits of thought, which shall find ready and adequate expression in language.

There are two departments in the school, the pure oral and the silent. In the former the pupils are taught entirely by speech, lip-reading and writing. In the latter by the intuitive method, as under the oral system, writing being substituted for speech. There are 98 pupils in the oral, and 43 in the silent classes.

The two departments are separated during school hours, and no signs are allowed in the process of teaching. So far as practicable every lesson is illustrated, either by the actual object,

pictures, or black board sketches; the ability to make such sketches being an essential qualification of the teachers.

The head master examines every child in the school once a month, discovers weak points, and offers suggestions, or issues instructions for future guidance.

The examination papers submitted are those for the month of April, and were in progress before the head master was aware that a section of the Exhibition would be devoted to the interests of the deaf and dumb. The papers have received no correction, and are bound up in volumes, representing the work of each class.

To train the powers of observation, proportion, &c., as well as to assist the children in the occupations they may follow, drawing takes a prominent place in the routine.

Fancy needlework is not discouraged amongst the girls, though it is not specially taught. The girls do all the making and mending for the Institution without a sewing machine, and samples are herewith submitted of hemming, seaming, stitching, felling, gathering, herring-boning, the making of a button-hole or loop and the insertion of a gusset or patch. Cutting out of garments, so especially useful for girls, receives careful attention. The girls are also taught every branch of domestic work.

A class for wood carving and turning affords an opportunity of profitable employment in leisure hours, and directs the attention of the boys in a channel which may hereafter become a means of livelihood. The carved wall mirror-frame and book slide, by W. Shotton, show the result of eighteen months' instruction.

Apparatus.—A deaf child speaks in consequence of its knowledge of the position of the tongue, &c., required for the production of certain sounds. The position of the organs of speech must be taught, and the reflector exhibited is for the purpose of illuminating the interior of the mouth, in such a manner that the child can see exactly the mode of production of such sounds as *g*, *k*, *j*, &c. In using it the teacher lights the jet and stands before a large mirror, with the pupil by his side. The attention of the child is directed to the reflection in the mirror, and the child tries to imitate what it sees; the teacher then turns the reflector to the child's mouth, and again directs its attention to the reflection in the mirror, and points out any defect. When once the pupil comprehends the nature of the sound required practice will ensure its reproduction. The reflector minimises the manipulation of the throat by the teacher.

The manipulator is simply a substitute for the finger; the curved end is extremely useful in obtaining the *ch* sound. The child is required to make the *t* sound; the teacher then gently presses down the tip of the tongue and the *ch* sound follows. It is also useful in perfecting *s* and *sh* sounds.

The vibrator is used to obtain such sounds as *z*, *zh*, *e*, *j*, &c. The teacher places one end between his own teeth, the other end against the teeth of the child; the latter, who also places his hand against the teacher's throat, feels distinctly the peculiar vibration and readily imitates it.

The accessory words in language present unusual difficulties to the deaf. The preposition box serves to demonstrate to the eye the use of almost every preposition and prepositional phrase. The lid should be on hinges to move up and down. Exercises with it should be as follows. *Mary, lift up the lid of the box. Put your thimble into the box. It (the thimble) is now in the box. It is inside the box. Who will take it out of the box? Will it pass through the hole of the box? Let me see! Here is a piece of string. Tie it (the string) round the box, &c., &c.* An ingenious teacher will readily multiply examples, embracing almost every preposition in use. The school books exhibited are those in daily use.

The whole of the exhibits are submitted with the object of showing how, in the above Institution, the deaf are taught the use of language, so as to take their place in the speaking world, with the results of their misfortune mitigated in as high a degree as is possible. (Room No. 10.)

1542. STAINER, REV. WILLIAM, 27, Alexandra Villas, Finsbury Park, N.

—The deaf require a special means of instruction, because the same conditions do not exist in them as in other children. Their deafness excludes them from the reception of ideas through the medium of sound, whilst the hearing child associates ideas with sound from its infancy. The deaf child is thus shut out from speech and all that speech conveys during its earliest years, and its only form of language previous to being brought under instruction consists of rude gestures. Taking these as the basis, we may improve them and add conventional and arbitrary signs, and so develop a language suited to their immediate wants, but in so doing we only provide them with the means of exchanging ideas amongst themselves and with their teachers; and to say nothing of the imperfection of this sign language as an instrument of thought and means of expression, we build up a barrier which excludes them from intercourse with the world at large. If it were desirable to form a community of deaf mutes, this would certainly be the best means to accomplish it; but it would surely be sinful to increase that isolation which is the most deplorable part of their affliction, and which it is doubtless our duty to endeavour by every means in our power to remove. All deaf children capable of instruction should therefore be taught to speak and use the language of those with whom they are surrounded in daily life. That they can be so taught is no longer a marvel, for day schools are now established in various parts of the metropolis, where the simple process by which dumb children are made to speak

can be witnessed by any one desirous of becoming acquainted with the method. To carry out the system effectually, an intimate knowledge of the elementary sounds of our language and how those sounds are produced is essential, as well as a facility of conveying that knowledge to the deaf child through the senses of sight and touch. Also an acquaintance with the formation of sounds into syllables and words, and the construction of sentences graduated to the different stages of development of language, and suited to the slow growth of the child's intellect. Happily special training can now be obtained at training colleges for teachers of the deaf by any one desirous of taking up this most interesting and benevolent branch of education; and when the time comes that these colleges are capable of supplying sufficient teachers to meet the demands of some five hundred deaf children who require instruction in the metropolis alone, we shall realise that change which is prophesied and so earnestly to be desired, that our "deaf and dumb" are now deaf *not* dumb. The pictures designed for the use of deaf children include three series. (1) 24 Picture Sheets, with 384 Illustrations of Objects. (2) 23 Picture Sheets, with 138 Illustrations representing actions. (3) 27 large Picture Sheets, containing Illustrations of the animal and vegetable kingdom, various trades, and the heavenly bodies. Every one of these is more or less useful in bringing before the *eye* of the deaf child the shape, form, and general appearance of things and persons with which he has yet to become acquainted, but in the words of an eminent teacher "the pupil must not be allowed to dwell upon the picture alone, but must have his attention directed to similar objects and circumstances in his own surroundings; in other words, he must be made to understand the living world in which he finds himself, and to a proper understanding of which the picture is only to be used as a help." The "Object Lessons" are for use with the "Object Pictures," and are necessary in teaching deaf children from the earliest stages. They form a "Reading and Language book" containing almost every word in common use, with an index of reference to nearly 2300 words found in the lessons. The easiest forms of language only are used, as it is essential with the Deaf just beginning to learn their mother tongue, at whatever age they commence, to use forms of expression which would be understood by infants in a nursery. (Room No. 10.)

1543. YORKSHIRE SCHOOL FOR THE BLIND. *General Remarks.*—The system pursued in this school is, that education in mental subjects shall be pursued simultaneously with training in some handicraft. This plan is found of great value, for the pupils are not withdrawn from mental training just at the time when they begin to think for themselves, as is the case with many seeing children. Hence we have youths, who are working at basket and brushmaking, attending school a certain time each day until they are nineteen or twenty years of age. The proof that this plan does not impede their industrial training is shown by the quality of work we exhibit. We believe, too, that a plan like this is conducive to their general good health. In addition to the usual school lessons and training in a handicraft, the school course includes musical training for those with suitable ability, and gymnastic exercises, including marching, dumb-bell practice, ladder exercises, &c. The systems of writing in use in the school are:—(1) *The old pin type*. One of the earliest adopted for the blind. It can be read by the seeing, and blind, with good tactile sensibility, can make it out. (2) *Braille type*, which is very legible to the blind, easily written by them, and is of great value. The books done in Braille type by the pupils are exhibited for the purpose of showing how this type may be made use of, by an intelligent teacher, to produce his own note or text-books for class use. (3) *Lead pencil writing by the blind*.—These specimens are written by means of the Gul-berg writing apparatus (also exhibited). The apparatus is the invention of F. Guidberg, a teacher in the Royal Blind Institution, Copenhagen. An ordinarily intelligent blind child, of eleven or twelve years old, will learn the use of the apparatus in about thirty or forty lessons of one hour each. *Raised maps or geographical models*.—These models show three methods of construction:—(1) *Palestine*, modelled in clay, from which this plaster cast, backed with linen, has been taken. (2) *Yorkshire*, coast line, sea and rivers carved out: mountains carved out of pieces of flat wood glued on the board. *The lines of railway* are made of wire stretched from one town to another, and are very useful in helping the pupils to find the various towns. *The rivers*.—In order to enable the pupil at once to know in what direction the rivers are flowing, the *right bank* is left with a sharp edge, and the *left bank* is bevelled smooth. (3) *England and Wales*. (4) *Europe*.—The clear, sharp *coast line* is made by cutting out the land from the water with a fretwork saw, thin planing say $\frac{1}{8}$ in. from the under-side of the water and screwing the whole down. The *mountains* were cut out in cork and then glued on. The *rivers* are cut out with a chisel or graving tool. *Macrame lace*.—The production of this work seems to be a useful addition to the few occupations which can be pursued by blind females. The material is cheap, apparatus simple, and the operation on the whole not difficult. *Cane work*.—This is also an operation eminently suitable to blind females, materials and tools being quite inexpensive. *Basket work*.—The samples sent are made entirely by present or former pupils of the school. The brushes and baskets exhibited are chosen from ordinary stock, and are not specially made for this exhibition. *Brushes*.—These are also drawn or set by blind pupils and men. The finishing of the woodwork is done by seeing labour. *Mats*.—These are made of Esparto grass by the younger boys, as a preparation for the work of basket making. (Room No. 11.)

1544 NATIONAL INSTITUTION FOR BLIND CHILDREN, 56 Boulevard des Invalides, Paris.

The National Institution for Blind Children, in Paris, which celebrated, on the 14th of May last, the centenary of its foundation by the illustrious Valentin Hauy, is the first school for the blind which ever was established in Europe. The Establishment, erected on the plans of the architect Philippon, occupies a rectangle, of an area of about 3 acres (11,800 square metres or 14,113 square yards), 4186 yards of which are covered by the buildings. It is bounded by the Boulevard des Invalides, the Rue de Sèvres, the Rue Duroc, and the Rue Masseran. In the centre of the entrance court stands a group, executed by Badiou, representing the founder of the school trying his method on young Le Sueur; the fronton of the building, erected by Jouffroy, represents Hauy, inspired by Charity, presiding over the works of blind children.

The buildings consist of a central edifice, devoted to the general services, and two side wings symmetrically opposed, that on the right being reserved to the boys, and that on the left being for the use of the girls.

Two distinct pavilions, which occupy together an area of 766 square yards, are appropriated to the professors' rooms. The ground floor of these pavilions forms in each ward a large covered yard or playground resorted to by the pupils in bad weather.

The chapel and the concert-room (salle des exercices publics) occupy the first and second floors of the central building, and may be connected or separated at will by means of wide doors. The choir and cupola of the chapel have been painted by Lehmann.

The premises are well arranged and ventilated; the class-rooms, studies, work-shops, dining-halls, dormitories, and infirmaries are commodious, and heated by hot-water and hot-air pipes.

A large open play-ground, planted in the form of a quincunx, joins each ward.

A bath-room, containing thirty ordinary baths and provided with shower-baths, enables all pupils to bathe at least once in fortnight.

Besides the organs for practice in each ward, the School possesses a grand organ, built by Cavallé Coll, consisting of thirty-six stops, three rows of keys, &c., which is placed in the Concert-room (salle des exercices publics). It is used for the higher studies, for public worship and for organ recitals.

There are, in the Boys' Department, workshops, in which boys are taught turning wood, reseating chairs with cane or rush, tuning and repairing pianos.

In the Girls' Department there is a workshop in which they are taught fancy work, needle-work, crochet, &c.

The School possesses also a printing-press, which issues a great many works (literature or music) for the use of the blind.

The Library contains 250 volumes in embossed print and 1400 volumes for the use of ordinary people.

The School receives 150 boys and 80 girls, and is under the jurisdiction of the Ministry of the Interior (Home Office).

The Director is assisted in the superintendence of education and teaching in the Boys' Department, by a Censor of Studies (Censeur), in the Girls' Department, by a Lady Superintendent.

A Chaplain conducts the services in the chapel and imparts the religious instruction. Due regard is paid to the conscience clause. Children of other denominations recognised by the State, receive their religious instruction from their own ministers.

The medical service is represented by a physician in ordinary, by several consulting physicians, by a consulting surgeon, a surgeon oculist, and a surgeon dentist.

Pupils are received in the school from ten to thirteen years of age. The course of studies lasts eight years, which period, under exceptional circumstances, may be either lengthened or shortened.

The boarding and tuition fees are £40 per annum. A number of scholarships are attached to the School.

The Institution is at once a Secondary and a Technical School, which, while imparting to the pupils the knowledge capable of raising their minds and maturing their intellect, provides them with a trade or a profession which will render them independent. The Institution is moreover a training college for its own professors, to whom it grants the degrees.

Amongst some of the eminent past students of the School, let us mention Rodenbach, who from 1832 to 1869 fulfilled in Belgium the duties of a burgomaster and of a deputy (member of Parliament); Penjon, a laureate of the competition between the College of Paris and Versailles, Knight of the Legion of Honour, and professor of mathematics at the College of Angers; Gauthier and Roussel, both professors at the Institution, and eminent composers of music, &c., (Room No. 11.)

1545 INSTITUTO PRINCIPE DI NAPOLI PEI GIOVANNI CIEGHI D'AMBRO I SESSI (Institute for Blind Children of Both Sexes, Naples).—(1) Objects for Touching; Specimens of Collection. (2) Complete Method, "Martuscelli System," of teaching the blind the form of letters and numbers. Apparatus to guide him to write with chalk, "Faldariga" carved. (3) Metallic Pen and Specimens of Writing in freehand without any help of the apparatus. Literary and Medical Instruction. (4) Books and Geographical Maps printed in the

Institution. (5) Productions of Works done in the Institution: Printing and Binding, Blinds and Matting, Baskets of all sorts, Carpentry, Turnery, Bootmaking, and Domestic Utensils. (Room No. 11.)

1546. ROYAL BLIND SCHOOL, Copenhagen. (J. MOLDENHAWER, Director).—There are 97 pupils, and room for 100. All pupils are above the age of 10 years. For the younger ones there is a preparatory school (infant school). All blind children in Denmark may be educated in the Royal Blind School. The teaching of shoemaking gives good results, and is very little practised elsewhere in the education of the blind. The other handicrafts taught give as good results, viz., basket-making, ropemaking, and brushmaking. The piano, violin and organ; and singing, harmony, and tuning are taught, and much use is made of the Braille system. Amongst the handicrafts of the girls ought to be mentioned the sewing by hand and by machine. The school has 6 classes, with an average number of 27 lessons each per week. We have much drilling, for boys and for girls separately. There is a printing shop for books, music and maps. (Room No. 11.)

1547. INSTITUTION FOR THE BLIND, Amsterdam. (J. H. MEIJER, Superintendent).—If the boys and girls of the Blind Institution at Amsterdam venture to take an active, although at the same time a very humble, part in the present Exhibition, it is only to show to the world how a good education is of the highest importance to the blind, as by its aid many will succeed in life who, without it, would have been helpless, unhappy, and a burden to themselves, their friends, or society. A closer union between the educated blind of different countries and parts of the world is already bringing the happiest results, in disseminating information, cheapening and simplifying educational apparatus, and thereby promoting the happiness and well-being of the blind throughout the civilized world. They know that the brilliant example set by the late Mr. Gardner has met with universal approval, and they hope that it will find many followers all over the world. The blind are best provided for not by receiving alms, but by a sound education and a good course of honest labour. This Institution was established in 1808 by the Dutch Freemasons, who continue to support it, although it has long been entirely independent of their Brotherhood, as is the newly founded infant school for the Blind at Bennekom, which is under the patronage of H.R.H. the Crown Prince, and may be considered as a preparatory school in the country. The latter, which is called Prince Alexander's Foundation, has 12, and the institution 62, pupils of both sexes and of every religious sect. Pupils can be received into the Institution from the age of 6 years, and remain there till the age of 18. They are taught, besides the ordinary school subjects: *Religion, "Braille,"* and different methods of *flat writing*, systems of *Guldberg, Foucaud, Hebold, Kleyn, French and German, piano and organ playing, piano tuning, basket and brush making, caning, matting, knitting, knotting, fancy needlework, silver and copper wire twisting*, &c. Connected with the Institution is an Asylum for honourably dismissed pupils, and for grown-up blind people, admitted under 30 years of age. It provides for 28 male and 32 female inmates. Both these establishments are in private hands, and are supported only by voluntary contributions, legacies, &c.—J. H. MEIJER.

The exhibit of Capt. L. Schuytkorver, Royal Dutch Navy, Knight of the King William Order, a writing apparatus for grown up people who have lost their sight at an advanced age, is sent in his own account. He is blind, and invented it himself. (No. 16.)

APPARATUS AND EXAMPLES FOR TEACHING. (1) Specimen of raised types for embossed printing. Teaching elementary reading, musical composition, cyphers, &c. (2) A case containing a progressive series of embossed reading books, beginning with a primer and ending with French and German reading-books for the highest class of pupils. (3) An Album with various proofs of dotted and flat writing according to the systems of "Braille," "Foucaud," "Hebold," "Guldberg," and "Kleyn." (4) A set of Metallic Raised Letters for teaching the elements of reading. (5) Specimen of Embossed Printing, from the Institution's own Press. Three cases. Teachers of Blind Institutions may ask for a copy. (6) Specimen of Dotted and Flat Writing-Embossed Printing, &c., on cards. (7) A "Braille" Writing Frame, French. (8) A "Foucaud" Writing Frame, French. (9) A "Guldberg" Writing Frame, Danish. (10) A Board for Elementary Mathematical Instruction. (11) A Reading-Book on the "Braille" System. (12) A Reading-Book on the "Moon" System. (13) A Raised Map for Teaching Geography (invented by J. H. Meijer). (14) Two Raised Maps for Teaching Classical Geography (published in England). (15) Two Frames for the Ordinary Flat-Writing, to be used by persons who have lost their sight in advanced life, invented and constructed during his blindness by the late Major G. P. Serraris, Bart. (16) A Frame for the Ordinary Flat-Writing, to be used by persons who have lost their sight in advanced life, invented by L. Schuytkorver (K.M.W.O.) Capt. Royal Dutch Navy, retired (blind). Constructed by Mr. Torner, at Sneek, Friesland. (17) Typhlographie (Belgian). (18) Portable Braille Frame, invented by the late Superintendent, Mr. Pablasek, of Vienna.

SPECIMENS OF SCHOOL WORK.—BOYS.

(a) Two Game-bags of knotted rope, one with I.H.E., 1884, worked into it, and another lainer. (b) Two Brushes with I.H.E. and 1884 worked into them. (c) One Plain Brush

(hair). (d) One Plain Brush (sparte). (e) One Hearth Brush (coloured hair). (f) Four Samples of Chair-caning. (g) Two Lined Knife-Baskets. (h) Two Open Worked Flower-baskets. (i) One Pic-nic Basket (small). (k) One Hamper (large). (l) One Open Worked Basket. (m) One Case containing a dozen Pipe-covers, some of them with initials, cyphers &c., made of silver-wire. (n) One Silver Watch-guard. (o) A Pair of Snow Slippers (to put round the heel in snowy weather, or on the ice).

SPECIMENS OF SCHOOL-WORK.—GIRLS.

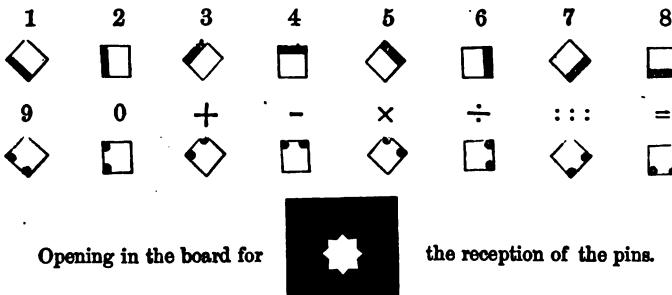
(a) One Antimacassar with "Blind Asylum, Amsterdam, 1884" worked into it. (b) One Anti-macassar with "Exposition Coloniale, 1883," worked into it. (c) One Anti-macassar with "Gesegend Instituut van Nederland" (Blessed Institution of the Netherlands) worked into it. (d) One Anti-macassar with "Instituut Amsterdam" worked into it. (e) One Anti-macassar with "Philadelphia, Amsterdam, Anno, 1876" worked into it. (f) Three Plain Anti-macassars. (g) One Cotton Ladies' Night Companion with I.H.E. worked into it. (h) One Blue Woollen Shawl. (i) Five Various Coloured Woollen, and One Cotton, Lampetland. (k) One Pair of bloured Woollen Baby-shoes. (l) Four Silk, and One Thread, Purse. (m) Various Specimens of Common knitting. All this work has actually been done by the blind pupils themselves. The one who made the anti-macassars a, c, and e, has both her eyes replaced by a pair of artificial ones. The male-teacher is perfectly blind himself and an honourably-dismissed pupil of the Institution. (Room No. 11.)

152. BRITISH AND FOREIGN BLIND ASSOCIATION (THE), (T. E. MITTAGE, M.D., Hon. Sec.).

Braille Frame.—This is a frame for enabling the Blind to write embossed characters according to the system of M. Braille. The brass frame contains sets of six pits. The guide is perforated by cells to correspond with them. It is hinged to the left end of the bed by a tud. The paper is laid between the two and the writer uses a steel point which forces the paper into the pits of the bed. The letters consist of raised points variously grouped. This frame is so arranged as to allow the writer to emboss both sides of the paper, thus securing a saving of space and greater clearness to the touch. A sheet of paper of the full size of this board can be embossed by a good writer on both sides in from twenty minutes to half an hour. The advantages gained by this method of writing are—The blind man can easily read what he has written; he can take notes of lectures, books, &c., which can be studied by him at his leisure. Children can be taught to write from dictation and therefore to become good spellers.

Embossed Maps.—Where the land meets the sea it is slightly, but sharply raised, and forms as it were a perpendicular cliff. The rivers are marked by depressions, the right bank in every case being perpendicular, the left bank shelving. In the physical maps the hills and mountains are marked with a sufficiently near approach to truth to give a very accurate idea of the configuration of the country. The maps are numbered according to the Braille system, and the towns are either in association with these or form part of the number, the top back dot standing for the town. Numbering these maps according to the Braille method, has made it possible to convey, without confusion, an amount of embossed information, which has never been attempted before, as most of the important towns are referred to in an explanatory index. The headlands, inlets, and rivers are numbered on the sea at a uniform distance of half-an-inch from the coast, which allows the finger of the blind person to sweep freely round the coast, while the information respecting each prominent feature is always close at hand.

Arithmetic Board.—The arithmetic board sold by the Association has eight-sided openings into which four-sided pins fit, having a plain ridge on one end, and two points on the other, thus eight positions of the pin can be obtained with the plain ridge uppermost, and by reversing the pin, eight more positions with the points uppermost, as will be seen by the following diagram.



Directions for Use.—The pins are square and the holes in the board into which they fit have

eight angles, so that each pin can be placed in eight different positions, and by reversing eight more can be obtained. The numerals up to 8, are formed by the end on which the *r* is situated; then the pin is reversed and the remaining signs obtained by the end on *w*; the points are placed. By this arrangement the signs in most frequent use are represented by the ridge, which is more pleasant to the finger than the points.

Pencil Cards.—These cards are intended to enable a blind person to write with a pencil. Paper is placed on the card, the ridges of which can be easily felt through the paper, and enable the writer to keep his lines straight.

THE BRAILLE ALPHABET, WITH CONTRACTIONS.

The large dots represent the raised points of the Braille letter; the small simply serve to indicate their position in the group of six.

A	B	C	D	E	F	G	H	I	J
but	Christ		every	from	God	have		Jesus	
1st line.	• .	• .	• •	• .	• •	• •	• .	• .	• .
	• .	• .	• .	• .	• .	• .	• .	• .	• .
	• .	• .	• .	• .	• .	• .	• .	• .	• .
K	L	M	N	O	P	Q	R	S	T
Lord		not		people	quite	right	some	that	
2nd line.	• .	• .	• •	• .	• .	• .	• .	• .	• .
	• .	• .	• .	• .	• .	• .	• .	• .	• .
	• .	• .	• .	• .	• .	• .	• .	• .	• .
U	V	X	Y	Z					
unto	very	you			and	for	of	the	with
3rd line.	• .	• .	• •	• .	• .	• .	• .	• .	• .
	• .	• .	• .	• .	• .	• .	• .	• .	• .
	• .	• .	• •	• .	• .	• .	• .	• .	• .
ch	gh	sh	th	wh	ed	er	ou	ow	w
child	shall	this	which	ed	er	ou	ow	will	
4th line.	• .	• .	• •	• .	• .	• .	• .	• .	• .
	• .	• .	• .	• .	• .	• .	• .	• .	• .
	• .	• .	• .	• .	• .	• .	• .	• .	• .

The signs of the 2nd, 3rd, and 4th lines are formed from those of the 1st by the addition of lower dots.

The signs of the 5th line are the same as those of the 1st, except that they are written in the middle and lower holes.

;	:	:	?	!	()	·	·
be	con	dis	en	to	his	in	was
Only as a separate syllable commencing a word.				Only when a separate word.			When used as a prefix it stands for by.
5th line.	• .	• .	• .	• .	• .	• .	• .
	• .	• .	• •	• .	• .	• .	• .
	• .	• .	• .	• .	• .	• .	• .
st	ing		prefix for numbers	end of line in poetry.	apostrophe.	hyphen.	When used as a prefix com.
6th line.	• .	• .	When at the end of a word, &c.				
	• .	• .	• .	• .	• .	• .	• .
	• .	• .	• .	• .	• .	• .	• .

The signs of the 1st line when preceded by the prefix for numbers stand for the numbers and the cipher.

The above alphabet was arranged by M. Louis Braille, a pupil of the Paris Blind Institute about 1834. It gradually superseded the Roman letter then in use, and shortly after its introduction was adopted for musical notation. It is now used everywhere in France, and is employed over the whole continent of Europe, as also in England, America, and Australia. Its great advantage is the ease with which it can be written, so that by its use a blind person can write out dictation and other exercises, and so be educated on the same principle as the seeing. Writing, indeed, is quite as important to the blind as to the seeing, and for the same reasons. The system is easy to read, and occupies a comparatively small space.

INTERLINING FRAME.

Directions for Using the Interlining Frame.—The width of the board is the gauge of paper, but as writing which is to be bound ought to have a wider margin than that obtained by paper exactly the width of the board, it is desirable to double over the right hand edge of the paper to the extent of about a quarter of an inch, in such a way that the paper with its

turned down shall be exactly the width of the board. Now raise the clip at the upper edge of the board, lay the paper with its edges flush to the edges of the board and with its upper edge against the top. Close the clip which fixes the paper on the pins. Enter the brass frame with its studs in the holes nearest the clip, so that the paper lies between the guide and bed; now write the first two lines and shift the brass frame for each successive two lines until the first page is written. Open the clip, remove the paper and replace it with its embossed side next to the writer, placing the burns formed by the upper clip pins on the pins projecting from the frame. This will bring the whole sheet one line lower. Now close the clip, enter the frame as before and write the second page. When this is done it will be found that the lines of the second page fall into the intervals of those of the first. By this method wide intervals are obtained between the lines which make reading more easy, while about 20 per cent. in space is saved.

"Progress," an embossed magazine for the blind, is published by the British and Foreign Society and Association for Promoting the Education and Employment of the Blind, 33, Cambridge Square, London, W., and is edited by Dr. T. R. Armitage, the honorary secretary of that Association. It is in the Braille type, which is a character consisting of raised points, now used very largely by the blind in most civilised countries. The objects of the magazine are to present the blind with information likely to be specially interesting to them, and also to give short articles of general interest. (Room No. 11.)

1549. ASYLUM FOR THE BLIND, Glasgow.—I. By Workers in the Manufacturing Department:—1st. Two Soiled Linen Baskets, with perforated bottoms containing disinfectants. 2nd. Invalid Bed Rest, as supplied to hospitals. 3rd. Bassinette of an improved construction, with Baby-linen basket attached. 4th. Improved Travelling Hamper. II. By Inmates of the Institution:—1st. Lace Knitted Goods. 2nd. Shetland Goods. 3rd. Silk Goods. 4th. Netted Goods. 5th. Ordinary Knitted Goods. Class 1st is the most difficult, and is confined to a few of the female inmates. Classes 2nd, 3rd, and 4th employ a much larger number of inmates. Class 5th is more easily learnt, and, as circumstances demand, any number of the female inmates may be employed in it. A ready market is found for the articles manufactured, but the price realized is not commensurate with the cost of production. The class of work most interesting to visitors is probably that connected with the manufacture of lace goods, not only in respect of the amount of patient labour required, but also of the beauty, intricacy and regularity of the pieces manufactured. The knitting and netting are taught by the Matron, an Assistant and a blind female inmate. The method employed is to place the fingers in the proper position, and to guide them till the pupil understands the art. (Room No. 11.)

1550. ROYAL NORMAL COLLEGE & ACADEMY OF MUSIC FOR THE BLIND, Upper Norwood, S.E.—The specimens in this exhibit have been made without exception by the blind children in the primary school of the Royal Normal College. These children entered school November 1, 1882; exclusive of vacations, they have had 15 months' instruction. Kindergarten work and modelling in clay, besides developing the faculties of the mind of blind children, cultivates and refines their touch, and gives that facility in the delicate use of their fingers which is essential in future work, especially for the modern technique required for the skilful performance on the pianoforte, organ, or other musical instrument. The preparatory school is conducted on the Kindergarten system. Fröbel's principle of self-work and self-help is far more essential in the training of blind than of seeing children. Special care is given to the moral, mental, and physical training of the children, and as a foundation for all their future work, orderly habits, good manners, and upright conduct are inculcated. Besides Kindergarten work, the instruction includes reading, writing, arithmetic, and object lessons in the elements of various subjects. (Room No. 11.)

1551. RHENISH PROVINCIAL INSTITUTION FOR THE BLIND, Düsseldorf, Prussia (Director, Prof. MECKER).—(1) Description of the Institution, by Prof. Mecker. (2) Rules and Regulations. (3) Periodical for the Blind, edited and published by Prof. Mecker, being the only technical paper for the blind published in Germany. (4) Apparatus used for Instruction. (5) Games and Amusements for the Blind. (6) Specimens of Work done in the Institution.

CLASS LVI.

Collective Displays of School Work Appliances.

1552. EDINBURGH SCHOOL BOARD, 25, South Castle Street.

(1) MODEL IN WOOD OF NORTH MERCISTON PUBLIC SCHOOL.—Robert Wilson, *Architect*. Accommodation.—Juveniles, 10 square feet per child, 711; infants, 9 square feet per child, 288; total, 969. Area of site, 1940 square yards. Total cost of buildings, including janitor's house, £8,152. The cost of school buildings, exclusive of janitor's house, is at the rate of £7 18s. 7d. per child, calculated at the 10 and 9 square feet limit. The cost is at the rate of £6 11s. per child, if the calculation be made upon the 8 square feet limit. This is a mixed school, boys and girls being taught together. The infant department is placed on the ground floor, and the juvenile department on the upper floor. On the ground floor there are the infant

hall or school room, with four class rooms extending from it. There are two other class rooms which may be used either with the school organization or with the juvenile department; also a large room, communicating with the school room, this room being fitted with piazza back-hand bunks. The upper floor is traversed by two staircases—one for boys, with an entrance from the front street, and one for girls, with an entrance from the side street. On the upper floor there are the central hall or school room, and seven smaller class rooms, with glass communicating between them. The rooms here also open into the corridors. Cloak room fitted with back-hand bunks, also provided for boys, girls, and infants.

Ventilation. Ventilation for the different rooms is provided by shafts 6 feet high in the windows of fresh air, and openings in the ceilings for the removal of the vitiate air communicating with shafts carried to ventilators on the roof; in the case of the rooms or rooms then the openings in the ceilings communicate with flues in the walls.

Heating.—The rooms are fitted with the patent Manchester grates, which, besides heating the rooms, are provided with a heating chamber, into which fresh air is taken, heated and sent into the rooms through a fluting placed over the fire-place.

Drainage. The drain pipes are ventilated by a "Buchan trap" with eye carried to surface with pipes attached to the roof or air pipes, and the soil-pipes from the wash-hand basin have tube open discharging traps. Separate playgrounds for boys and girls are provided having covered play sheds and offices for the children. The offices are ventilated externally in the walls and ventilation on the roof. The playgrounds and offices are paved with "patent transolithic" pavement. A janitor's or caretaker's house is placed at end of the large playground.

This school was open for the first time on September 3rd, 1883, and the average number in the roll for the four weeks ending May 2nd last was 811. The present staff consists of head master, mistress of infant department, first assistant, and seven assistants, all of whom are remunerated. In addition to these there are the sewing mistress, singing master, and pupil teacher. This staff will be considerably increased on the maximum attendance reached.

In order to see the internal arrangements of Juvenile Department, lift up the portion to the right end of front marked "1." 2 is a small table and we have marked "2." 3 lift the partition over centre 1. 4 is a portion of the wall 6 feet high. In replacing the roof observe the reverse in arranging the portion over which back is. Note that the end marked "front" is in reality the back end. To examine the internal arrangements of Infant Department, lift up the portion to the right end of front marked "1." Note that handker-

1900, the new building was completed. The new building, showing arrangements of
classrooms, lecture rooms, library, and other parts of the school. Back part of build-
ing, showing arrangement of classrooms, lecture rooms, library, and other parts of the school. Mr. Hamilton B.

22
11
10
9
8
7
6
5
4
3
2
1

Accommodation.—10 square feet per child for juveniles, 545; 9 square feet per child for infants, 280; total, 825. Cost of school buildings and furnishings, £7334, being at the rate of £17s. 9d. per child. Area of site, 1350 square yards. This school consists of ground and first and second floors.

The average number on the roll for the four weeks ending 2nd May last, was 1187. The staff consists of a head master, infant mistress, first assistant, and eight assistants, all of whom are certificated. There are also a sewing mistress, singing master, and twelve pupil teachers.

(6) STOCKBRIDGE PUBLIC SCHOOL, PHOTOGRAPH OF. Infant Department on ground floor; Juvenile Department on upper floor.—R. Rowand Anderson, LL.D., Architect.

Accommodation.—10 square feet per child for juveniles, 371; 9 square feet per child for infants, 252; total, 603. Cost of school buildings and furnishings, £9042, being at the rate of £14 19s. 10d. per child. Area of site, 2681 square yards.

The average number on the roll for the four weeks ended 2nd May last was 835. The staff consists of a head master and infant mistress, first assistant and four assistants, all of whom are certificated. There are also a sewing mistress, singing master, and nine pupil teachers. In connection with this school an extensive gymnasium has been erected and fitted up by the Board, in which the pupils of the higher standards of all the schools (male and female) receive regular courses of lessons in gymnastics and calisthenics. The gymnasium is also open on Saturday afternoons to the pupil teachers (male and female), who also receive courses of lessons in gymnastics and calisthenics from regular qualified instructors.

(7) WARRENDER PARK SCHOOL, PHOTOGRAPHS OF.—(a) Exterior of, (b) Interior views. Infant Department on ground floor; Juvenile Department on upper floor.—Robert Wilson, Architect.

Accommodation.—10 square feet per child for juveniles, 626; 9 square feet per child for infants, 254; total, 880. Cost of school buildings and furnishings, £8866, being at the rate of £10 1s. 6d. per child. Area of site, 1912 square yards.

This school is the only one under the management of the Board in which any pupil has to pay as high a fee as ninepence a week; the highest fee per week charged in any of the other schools being sixpence a week. In this school pupils have an opportunity of continuing their studies far beyond the standard work, and of receiving such higher training as may fit them for entering the University. In addition to all the ordinary subjects of instruction the following are taught daily, viz. Latin, Greek, French, and German. The school was opened for the first time on the 3rd September, 1883, and the average number on the roll for the four weeks ended 2nd May last was 695. The present staff consists of a head master, infant mistress, first assistant, and six assistants, all of whom are certificated. There are also a sewing mistress, singing master and seven pupil teachers. Two of the latter have finished their apprenticeship and have been continued by the Board for another year. The staff will be largely increased when the maximum attendance is reached.

In the elementary schools the fee includes the cost of school books, which are supplied by the Board.

(8) ROYAL HIGH SCHOOL. Two PHOTOGRAPHS OF.—(a) One from the south-east, (b) one from the south-west. This is the only secondary school under the management of the Edinburgh School Board. The High School originally stood in the Old Town, near the site of the old infirmary, and was rebuilt on nearly the same spot in 1777. Shortly after the beginning of the present century, a change of situation being loudly called for, owing to the great extension of the City towards the north, and the rapidly increasing number of pupils, the Town-Council, with praiseworthy zeal, at once took steps to meet the requirements of the community. The present structure, which stands on the south slope of the Carlton Hill, was designed by Thomas Hamilton, a pupil of the school. It was founded in 1825, and completed in 1829, at a cost of £30,000. The length of the main building is 270 feet, being 15 feet longer than the principal front of the University, but if the class-rooms on the right, and Janitor's or Caretaker's house on the left of the accompanying photograph be included, there is an architectural composition extending upwards of 400 feet. The central portico is hexastyle, and having a double row of columns, projects considerably in front of the general facade. The distinctive feature of the building is of the purest Doric, the general proportions and most minute details of the Temple of Theseus having been closely adhered to. The peristyles, each consisting of six smaller Doric columns with corresponding entablatures, extend from the great portico to the extreme compartments of the building at each end. The columns amount to twenty-eight in number, those of the portico being upwards of 20 feet in height. The leading features of the extreme portions of the main building are derived from the monument of Thrasylus, having the antae and entablature somewhat similar, but without the strict adherence to the proportions of the original which has been observed in the portico. The principal room in the edifice is the hall, which occupies the centre, and is 75 feet by 43, and upwards of 30 feet high. The building and playground occupy an extent of two acres, and command one of the most picturesque views in the city. The date of the foundation of the High School is unknown, but it appears to have existed as early as the beginning of the twelfth century. From that time to the Reformation, the "Grammar School of Edinburgh," as it was then called, was under the control of the canons of the abbey of Holyrood. In 1598, by the enlightened zeal of the clergy and town-council, it

was established on a more comprehensive plan; and, from the special patronage vouchsafed to it by James VI, it received the name which it still bears—*Schola Regia Edinburgensis*. For upwards of three centuries the school was managed by the town-council. In August, 1872, the Education Act transferred it, as one of the higher class public schools, to the management of the Edinburgh School Board. It has long been at the head of the great schools of Scotland. In the roll of its scholars are the names of some of the most distinguished men of all professions, and who have filled important situations in all parts of the world; and it is worthy of note that it contains the names of three Lord Chancellors of England—natives of Edinburgh—Alexander Wedderburn, First Earl of Rosslyn, Thomas Erskine, and Lord Brougham. The school provides boys with a liberal and useful education, qualifying them for the Universities, for Civil Service and other appointments, and for professional or commercial pursuits. The course of instruction includes the English, Latin, Greek, French, and German languages; mathematics pure and applied; arithmetic, writing, book-keeping; geography and history, ancient and modern, the elements of natural science; drawing, fencing, gymnastics, Hindustani, and shorthand. All the pupils have access to the school library, which contains nearly 10,000 volumes. For further particulars see *Prospectus*, and Steven's 'History of the High School.' For detailed account of instruction, &c, given in this school see *prospectus* for 1884-85, to be had in Exhibition. (Room No. 1.)

1557. SCHOOL BOARD OF GLASGOW.—(1) The Explicit Map of Scotland and Lanarkshire. This map has been designed to teach large classes with greater comfort and success than could be obtained by studying small maps, crowded with an amount of information which perplexes the eyes of body and mind. One thing at the time is the idea intended to be carried out. For example: counties and towns, rivers and towns, railways and towns, &c, &c. are shown separately. The bold lines, bright colouring, great size and consequent clearness enable pupils to study geography with a pleasure otherwise unattainable. The map has been designed by Mr. John Donald, the Head-master of Dennistoun Public School, belonging to the School Board of Glasgow. (2) Ball Frame. This ball frame differs from all others in being larger and more durable. In the ordinary ones the wires become very easily bent, and present to the young eyes a very uneducative object in the shape of a crooked line, and the balls being of diminutive size are easily split and the numbers become incorrect. The ball frames in a great many catalogues contain only ten balls, which make an awkward total. This one, with twelve balls in twelve lines, contains the ordinary multiplication table. The ordinary ones, standing on one stand only, are top-heavy and easily capsized, and are awkward pieces of furniture in an infant school. With a bright, intelligent teacher to use the ball frame it is a most useful object to fix numbers in the young mind, which finds great difficulty in grasping "abstract numbers." The ball frame has been designed by the Rev. Cuthbert Wood, one of the members of the School Board of Glasgow, and is used in all the schools under that board. (3) Reading, Writing, and Arithmetic Frame. The mixed "Reading, Writing and Arithmetic Frame" is, as its name implies, used in teaching these subjects. On one side is a ground glass surface for writing and arithmetic, and on the other side, by the turning of a handle, there is brought under the view of the class a succession of graded reading lessons. This apparatus is very convenient, as it contains within itself all that is necessary for teaching the above subjects to infants at this stage. It is specially useful for large classes; 150 have been taught at once. The reading lessons are printed by Messrs. Blackie and Sons, 49 and 50 Old Bailey, London, E.C., and are intended to be used in connection with the corresponding book issued by these publishers. These are the largest reading sheets yet produced, and the following advantages are claimed for them:—1. They are beautifully illustrated, and thus at once attract the attention of children. 2. They are printed in letters so large that pupils seated at a distance can easily follow each word, and readily keep the place in the lesson. 3. They are a means of greatly economising the teacher's time in dealing with large classes. 4. They promote discipline, inasmuch as the children are simultaneously engaged in the same work. 5. They will be found an excellent aid to fluent reading, from the rapidity and ease with which the pupils are taught to gather up words into phrases and sentences by merely watching the motion of the teacher's pointer. 6. The large size and clearness of the letters prevent the straining of the eyesight. This is an advantage the publishers desire to bring prominently before teachers, as it is a very important feature. This frame has been designed by Mr. John Donald, the Head-master of Dennistoun Public School, belonging to the School Board of Glasgow, and is used in the schools under that board. (4) Model of Gorbals School. This is a model of a mixed school, in course of erection, situated at the corner of Clyde Place and Buchan Street, with a frontage also to Kirk Street. The principal façade faces Clyde Place and overlooks the river. The external walls are all built of freestone, and the interior walls of brick. The class-rooms are all heated throughout by means of hot water pipes, and so arranged that each room can be heated separately irrespective of the adjoining class-rooms or school-rooms. The fresh air inlets are all from the outside walls, connected by conduits to coils of pipes under stages. These stages are perforated next walls, having iron grating set into floors as a means of exit for the fresh heated air. Close to the ceiling there are openings into flues having fire-clay linings, which flues are carried up into chimney stalks standing

inches above line of ridge of roof. On each of these flues will be placed one of Munn's Patent ventilators as a means of extracting the vitiated air. On the ground floor accommodation is provided for the infant and initiatory departments, as well as cloak-rooms, lavatories, and private rooms for head-master and mistress. A special additional entrance is provided for the infants, so that they will have direct means of communication with the playground. On the first floor accommodation is provided for the juvenile and senior departments, and the second or upper floor will be utilised for drawing-class rooms, modelling rooms, &c. One of the greatest difficulties to contend with in a mixed school of this capacity is to adapt an arrangement of stair so that the different sexes may pass from their several class-rooms and school-rooms direct to their respective playgrounds without coming in contact or mixing with each other. This has been overcome by the arrangement adopted for this school, as will be seen by reference to model. Each of the sexes have separate stairs, so that there are no means of intercommunication save in their respective class-rooms. In the entrance, over boys' entrance, private rooms are provided for the assistant masters. The girls and infants enter from Clyde Place, and the boys from Kirk Street, each having separate playgrounds and latrines. The school provides accommodation for 314 infants at 8 sq. ft. per scholar, and 896 boys and girls at 10 sq. ft. per scholar, with drawing-class-room accommodation for 242 scholars at 20 sq. ft. per scholar, thus providing accommodation for 1452 scholars. The architect for the school is Mr. Henry Higgins, Junr., 252 West George Street, Glasgow; and the maker of the model, Mr. John Baxter, joiner, 20 Catherine Street (off Parliamentary Road), Glasgow.—(Room No. 1.)

1558. BIRMINGHAM SCHOOL BOARD.—Model of Board School Building in Foundry Road Birmingham. This model shows a complete set of school buildings on the class room system, which system has now been entirely adopted by the Birmingham School Board. In the earliest days of the Board, when much of the instruction was given by pupil teachers, the rooms for each school department consisted of one very large room, with two, or at the most three, small class rooms. Subsequently the employment of more adult assistant teachers led the Board to provide a greater number of class rooms, which were separated from the principal rooms by glazed partitions. Continued experience has led the Board to the conclusion that large classes in large town schools ought to be taught as far as possible by adults, and that young apprentices ought rather to be employed with a view to learning their profession efficiently, hence the tendency has been to provide more class-rooms, and in the older schools the large rooms have now been divided by means of revolving shutter screens. In this way all the schools are worked to a large extent on the class-room principle. The newer schools provide separate class-rooms for all the classes, and also a large central hall which is used for assembling the whole school together, and also for examination purposes and for parents' meetings, &c. It is believed that the supervision of such a school is most complete when all the rooms are on the ground floor, and the model now exhibited is of a school arranged on that plan. This arrangement, however, is possible only in neighbourhoods where the land is comparatively cheap. In densely populated districts, where sites are costly, the Board has been compelled to arrange the class-rooms on two levels, the upper rooms being reached by means of a light gallery running round the Central Hall. The cost of one of these sets of buildings, including the Central Hall, is generally about £10 per head. This of course does not include the cost of the site, which necessarily varies according to situation. It provides 10 square feet of area for every child above the infants, and 8 square feet per child for the infants. The central hall is not counted in the accommodation. The exact amount of the builder's contract for the school in the Foundry Road was £9390, and the total cost, including furniture and fittings, architect's commission, clerk of the works, tar-paving of extensive playgrounds, and all other incidentals was £10,685. The large hall measures 77 feet 6 inches by 30 feet, the class-rooms are each 25 feet 6 inches by 23 feet 6 inches, and the large room for the infants is 46 feet 9 inches by 30 feet. The floor of the large hall is composed of blocks of wood laid on a bed of concrete, and caulked with a mixture of tar and tow. The class rooms are boarded in the usual way. Dual desks are provided, the floor being stepped in some of the class-rooms and flat in others.

Raised Plan of the Site of the Borough of Birmingham. In order to inculcate clear notions of the elementary principles of physical geography, it was considered most desirable that the scholars should be made to understand the general features of their own town, with its various elevations, water courses, &c. For this purpose a plaster cast was carefully prepared by a student of the Birmingham School of Art, from the contour lines furnished by the Borough Surveyor. Other casts were easily taken from the first one, and having been painted so as to show the principal streets, the lines of railway, the most important public buildings, the parks, streams, and reservoirs, the children are enabled to gain a much better knowledge of the geography of Birmingham than they could obtain by any other means. They are also led to use their reason in reference to the physical features of other districts, and to understand maps much more intelligently. One of these casts is provided for every school, and a map of the Borough is also furnished with each, so that the scholars may study the two together.

Exhibits illustrating the teaching of Elementary Science by means of experimental lectures. This is accomplished by an itinerant system of science teaching, as follows: The Board

appointed, in June 1880, a Science Demonstrator. Three Assistant Demonstrators have since been appointed, and there are also three junior assistants, lads of 15 to 18. The salaries amount to £750 per annum. For this sum the Board is able to secure efficient science instruction for 30 schools, and also instruction to assistants and pupil teachers in evening classes. Mechanics is taught to the boys, and domestic economy to the girls. Six of the boys' schools also take Magnetism and Electricity, and one Animal Physiology. Three girls' schools also take Physiology as a second specific subject. A wide interpretation has been given to these terms; thus under the head of Domestic Economy as much Chemistry and Physiology are taught as will enable an intelligent girl to comprehend the familiar facts of house life. About £400 has been expended in the purchase of apparatus. This is kept at the Science Laboratory, a building erected at a cost of £1450, in connection with the Icknield Street Board School. Here all the apparatus necessary for the experiments is prepared and packed in boxes which fit into light handcarts. In these the apparatus is carried round from school to school, two teachers and two assistants accompanying each handcarts. In each school department a tressel table is kept for the purpose of the Science Lessons. On reaching the school, the junior assistants carry in the boxes, unpack the articles and place them on the tables, and the lesson goes on simultaneously in the boys' and girls' schools. In this way one set of apparatus serves for 30 schools, and each Science Teacher can visit four departments per day, giving a lesson of 45 minutes' duration in each school. A Demonstrator (or one of his assistants) visits each class once a fortnight, and in the interval each class teacher (who has been present at the lesson) gives a recapitulation of it to his scholars. An examination is worked on the subject matter of each lesson, and the papers worked are submitted to the Demonstrator at his next visit. Thus systematic and continuous teaching by a specialist is secured, the teaching is practical, and every fact or law is demonstrated experimentally. Nearly 5000 children come under the influence of this method of teaching science, and the pleasure and profit derived by them have been so evident as to disarm all criticisms adverse to the introduction of Elementary Science into Board Schools. Science Classes for Pupil Teachers and Uncertificated Assistants in Physiography, Magnetism, and Electricity, and Chemistry, are held in the evenings, and are attended by about 300 scholars; the same apparatus is employed as in the day schools. The work is shortly to be extended, by the establishment of a Technical School for Seventh Standard boys. Already about twenty Science Scholarships have been awarded, some of which enable boys to pass on to King Edward's Grammar School and afterwards to the Mason Science College. Testimony has been borne to the value of science teaching given in this manner, not only by teachers and parents, but also by the leading manufacturers of the town.

Models of Apparatus. These are copies of the articles used in the Science Demonstrator's Lessons, and have been made by the boys, at their homes. They are rough in character, but are all serviceable, and are of interest as voluntary efforts, and as showing the vivid impression made by the original objects. They have been made by boys whose ages vary from 11 to 13.

Drawings done by scholars, illustrating the various mechanical powers, the lever, wheel and axle, toothed wheel, pulley, inclined plane, wedge and screw, the steam engine, water pressure, crane, balance, specific gravity apparatus, &c.

Essays and answers to questions upon Mechanics, Magnetism, and Chemistry. The essays embrace such subjects as oxygen, the hydrostatic press, matter, description of a science lesson, &c. In the answers to questions, numerical details relating to the simple machines are worked out.

Essays and Answers to Questions upon Domestic Economy and Physiology (Girls). Essays have been written on the sick-room, health, water, oxygen, gases, carbonaceous foods, selection of clothes, structure of the body, food, ventilation, dress, washing day, exercise, rest and sleep, description of a science lesson, &c.

Apparatus, Diagrams, &c., exhibited by the Science Demonstrator's Department of the Birmingham School Board. 1. Syllabuses of the subjects taught. (a) Mechanics, three stages. (b) Domestic Economy, three stages. (c) Animal Physiology. (d) Electricity and Magnetism. 2. Lists of the Apparatus employed for the three stages of (a) Mechanics and (b) Domestic Economy, shewing the cost of each article. 3. Text Books used. (a) Mechanics, by W. J. Harrison, 3 vols. (corresponding with the three stages of the subject), published by Nelson & Sons, 1s. each. (b) Domestic Economy, by W. J. Harrison, 3 vols., Nelson & Sons, 1s. each. 4. Model of the Human Heart, by Anyoux of Paris, employed for the teaching of domestic economy and animal physiology. 5. Sets of Apparatus for teaching (a) Elementary Magnetism, 14s. (b) Frictional Electricity, £2 10s. (c) Voltaic Electricity, £2. Designed by W. J. Harrison, and made by Morris Bros., Branston Street, Birmingham. 6. Diagrams for teaching domestic economy. (a) House in unsanitary condition. (b) House with all defects remedied. 7. Photographs illustrating the science teaching carried on in the Birmingham schools. (a) Tressel Table placed in front of class, to receive demonstrator's apparatus. (b) Three Achromatic Telescopes, used in playgrounds on fine nights. (c) Cupboard with glass front and drawers, used as school museum. (d) Bi-unial Optical Lantern, cost £50, presented to the board by Messrs. R. and G. Tangye. (e) (f) Trucks, or Handcarts, with boxes provided to carry the science demonstrator apparatus from school to school.

Needlework. The system of teaching needlework in the Birmingham Board Schools is

very thorough and comprehensive one, beginning with the baby class in the infants' department, and finishing with the girls in the 7th standard. Lap bags, marked with the child's name or number, are used to keep all work in, which may be in the course of making. All garments and knitting in both departments are expected to be finished at the end of the school year; the cleanliness, fixing, and cutting of these are made the chief points of merit. The girls above standard 1 receive a certificate from the Board if they have satisfied the above conditions, and work a good specimen on examination day. Special attention is given to cutting out, which is taught by a method of foldings, and the girls in standard 3 and upwards are expected to be able to cut out a garment in paper one-fourth the ordinary size, in the presence of the Board examiner, as part of the examination work. Diagrams of garments in each standard are supplied to the girls' departments by the Board. Demonstration frames are used for the various stitches, and are found of service. In the infants' departments both sewing and knitting are taught to the boys. Every child in both departments works a specimen for H.M. Inspector, which in standard 1 and upwards are fixed by the children themselves. Specimens of work actually done for H.M. Inspectors are exhibited. The pupil teachers' work is reported upon to the Board from time to time, and the assistants are expected to obtain a certificate from the examiner, the conditions of which embrace the giving of a lesson in cutting out.

Specimens of Needlework done by the scholars in the Birmingham Board Schools in the presence of the Inspector of Needlework and of H.M. Inspector of Schools. No piece of work is exhibited which was not worked in this way at the time of the Government examination.

Model of Revolving Shutter Screen. This particular kind of screen was first made for the Birmingham School Board by Messrs. Hodkinson & Clarke, of Canada Works, Small Heath, Birmingham, and has since been adopted in all the Birmingham Board Schools, excepting only those class-room schools in which such screens are not required. They are found to be cheap, light, and convenient, and can easily be removed.

Cupboard with Revolving Shutter Front. These cupboards, which are supplied by the same firm, are now almost exclusively adopted by the Birmingham School Board. The shutter-front excludes dust and avoids the constant inconvenience of doors, while they are at least as cheap as ordinary cupboards.

Abbot's Arithmetical Ball Frame. This has not been in any sense specially provided for the Birmingham School Board, but it has been adopted by them, and is found to be much more useful than the arithmetic ball frames previously provided. (Room No. 8.)

SCHOOL BOARD FOR LONDON.

GENERAL ARRANGEMENT.

- A. SCHOOL ACCOMMODATION OF LONDON.
- B. SCHOOL BUILDINGS.
- C. SCHOOL FURNITURE.
- D. SUBJECTS TAUGHT—BOOKS AND APPARATUS.
- E. MISCELLANEOUS EXHIBITS.
- F. INDUSTRIAL SCHOOLS.

A. SCHOOL ACCOMMODATION OF LONDON.

The Elementary Education Act of 1870, commonly known as Mr. Forster's Act, laid it down that there should be "provided for every school district a sufficient amount of accommodation in Public Elementary Schools available for all the children resident in such district for whose elementary education efficient and suitable provision was not otherwise made."

For all Boroughs and Parishes outside the Metropolis it remained to be decided, after enquiry by the Education Department, whether School Boards were required or not. But in the case of London the great deficiency of school accommodation was so notorious that a School Board was created by the Act itself.

In the year 1871, that is in the year following the passing of the Elementary Education Act, the number of school places in efficient voluntary schools was 262,259.

At Christmas last the number of school places in efficient voluntary schools was 260,906, and in Board Schools 307,330, i.e. in all 568,236.

Of the accommodation in Board Schools, some was provided in schools which had been transferred to the Board, and some in temporary schools, but the bulk of the accommodation, amounting in all to 234,330 school places, was provided in 277 New Permanent Schools which had been built by the Board.

See Statistical Chart No 1, and School Map of London, No. 2, in Corridor.

B. SCHOOL BUILDINGS.

Before the date of Mr. Forster's Act, elementary schools throughout the country usually consisted of one large room and a small class-room, or perhaps in some instances two small class-rooms. From the time when the earliest school of the School Board was planned, the Board determined to provide a larger number of class-rooms in each school, in order to ensure more effective teaching. Previously, indeed, schools would appear to have been built by architect

with a view rather to external appearance than perfection of plan and suitability for teaching. One of the earliest schools erected by the Board was entirely on the class-room system, and in recent years the tendency has been more and more in this direction. The size of the class-rooms depends upon the composition of the staff. The Board, generally speaking, have been in the habit of reckoning that an adult teacher can take charge of an average class of 60 children, and a pupil teacher of 30 children. The class rooms, as a rule, accommodate 60 children; but class-rooms have also been arranged for 90 children, so that an adult teacher and a pupil teacher may work side by side. Amongst the later schools regard has also been had to the different numbers of children in different standard, and rooms accommodating other numbers, such as 50 and 70 children, have been introduced. The Board have recently adopted a pupil teachers' scheme, by which pupil teachers in the last two years of apprenticeship may take charge of classes of 40 children as responsible teachers. In future schools of the Board, therefore, it will be necessary to provide class-rooms to accommodate 40 children.

It has always been felt desirable that there should, if possible, be one general assembly room, for religious instruction, collective lessons, music, addresses of head teachers, examinations, &c. The Board have therefore in each of their ten divisions built one or more school or schools with a central or other hall.

Many improvements have been introduced into the later schools, for example: corridors of communication, so that the classes may interchange without noise or confusion: increased cloak-room accommodation, so that each child may have one peg for cap or bonnet and cloak; and, in addition, ample lavatory accommodation has been provided. In all respects the health of the children, as far as possible, has been carefully considered.

In regard to the question of lighting, the rooms are invariably lighted from the left, unless other exigencies of the plan preclude this arrangement. Thus, where it is considered desirable to have three class-rooms in a line in order to be able easily to throw them together, only one room can be lighted from the left, a second being lighted from the right, and a third from the rear.

Another of the improvements consists in warming thoroughly the corridors, so that on the opening of a door during school-hours the difference in temperature fails to cause any sudden blasts of air through the rooms, which would give the children cold, and produce general discomfort. Nor is the important point of warming the cloak-rooms overlooked.

A further and most vital point in connection with the planning of schools is the ventilation, whereby copious draughts of fresh air are admitted into the rooms, and ample arrangements made for the extraction of the foul air. The rooms are thus found singularly fresh and sweet, even at the close of school work. It would be impossible to point out in detail all the various methods used to ensure the constant vivifying influence of fresh air during school hours, seeing that they must necessarily vary under different circumstances; but it must be sufficient to state that the greatest importance is attached to the principle.

The great care exercised in reference to sanitary matters has no doubt had a powerful effect in preventing the Board Schools from becoming the centres of contagion or infection. Still, in spite of this, difficulty is experienced, especially in the closely crowded districts of London. To obviate any danger, a system of disinfectants is used, by which it is believed the children are, as far as possible, protected from disease. Whenever several children are seized with the same disease in a school, it is the practice of the Board to close the building for a few days, and to thoroughly disinfect the whole before re-opening.

In the schools of three storeys the stair-cases are placed at each side of a block of mezzanines consisting, alternately, of cloak rooms and teachers' rooms. In one corner of the block the coal-lift is provided, with access from each floor and a direct communication with the cellar in the basement. All the Board Schools of great height are provided with a lightning conductor.

It has been felt by the Board that a proper playground is absolutely essential, particularly in those parts of London where there are few open spaces. The Board have, consequently, wherever it is possible, secured an adequate site.

The earliest sites purchased by the Board have proved to be insufficient in area, when judged by the light of later experience. While the sites formerly chosen varied from one quarter of an acre to half an acre, it is now no uncommon thing in the outlying portions of the metropolis to find sites ranging from three-quarters of an acre to an acre, and even in rare cases to an acre and a half.

These playgrounds are open not only to children on the roll of the Board Schools, but also to other children in the neighbourhood during good behaviour.

As a general rule, where the space is sufficient, the following gymnastic apparatus is provided:—For the Boys' Department—a giant stride, a set of horizontal bars, and two pairs of parallel bars. For the Girls' and Infants' Departments—two swings and two inclined planes.

A drinking fountain is also provided in each playground.

In voluntary elementary schools there was usually teacher's residence, and the teacher had charge of the building. It has been felt, however, by the London School Board that in the interest of the teachers it is desirable that they should dwell at some little distance from the place of their work; and the Board have, consequently, in lieu of teachers' residences, built *school-keepers' houses*.

The average cost per head of the schools of the Board has been as follows:—Purchase of land, including legal and surveyors' charges, £6 0s. 9d. Erection of Buildings and Cost of Superintendence, £10 9s. 8d.; Furniture and Fittings, 10s. 8d.; Total, £17 1s. 1d. per child.

Specimens of three schools are exhibited in the cases in the centre of the room.

3. Alton Street, Tower Hamlets. Elevation Model. Observe covered playground for girls on roof.

4. Crawford Street, Camberwell. Model of single storey school; roof removed to show interior arrangements.

5. Carlton Road, Kentish Town. Elevation Model.

6. Carlton Road, Kentish Town. Plan of boys' floor.

C. SCHOOL FURNITURE.

(Nos. 7 to 23.) These exhibits will be found in southern part of room.

7 to 11. *Dual Desks*.—The most important articles of school furniture are the scholar's desk and seat. In earlier days the scholars sat in rows, on a long unbacked seat in front of a long desk. The main objection to this arrangement was that the teacher could not have access to the pupil, and that the pupil could not reach or leave his seat without inconvenience to others. Moreover, in this arrangement, the various objects for which the desk has to be used were not sufficiently considered. In the abstract it would appear that the best form of desk would be the single desk; but the objections to this are two-fold: firstly, that a class-room of single desks would necessarily have to be increased in size, and, secondly, the cost would be excessive. When planning their earlier schools, the School Board for London gave careful attention to this question, and had the advantage of the advice of Dr. R. Liebreich, of St. Thomas's Hospital. Ultimately they decided upon the dual desk and seat (*i.e.* a desk and seat for two scholars), of which the following are the main advantages:—The teacher has access to the scholar, and the scholar can leave his seat or return to it without interfering with any other scholar. In the case of the old desk it was necessary, in order that the scholar might stand in his place, that the desk should be at some distance from the seat, the result of which was that the pupil whenever writing was compelled to lean forward, and so contract his chest. In the dual desk, as at present designed, the inner edge of the desk is vertically above the outer edge of the seat, so that the scholar can write without inconvenience. Further, by an arrangement which admits of a part of the desk being turned upwards, the scholar is enabled to stand, without leaving his place. And again, the desk, in consequence of this arrangement, has two different angles; one of 15 degrees in its original position for writing, and the other at a greater angle for resting the books when reading. Moreover the seat is so arranged as to slope upwards from rear to front, and has a rail which fits into the hollow of the scholar's back, thus affording complete rest when the child is sitting and reading or listening to the lessons of his teacher. The desk is also fitted with a shelf for books, and with a recess for slates.

In an ordinary class-room, with accommodation for sixty children, there would be six files and five rows of desks (or, in a square room, five files and six rows); in a class-room for ninety, nine files and five rows, and so on. The desks in the same class-room would naturally be of the same size; but owing to want of space the different rows here are of different sizes, in order to illustrate the desks used for scholars of different ages, *e.g.* No. 7 is for senior scholars and pupil teachers; Nos. 8, 9 and 10 are for younger scholars (Note Card of Desk Drill attached to desks); No. 11 is a Kindergarten Desk and Seat for infants. [See hereafter, D (m).]

The other exhibits under the head of School Furniture are as follow:—

12. *Master's Desk, Chair, and Platform*.

13. *Class-Room Cupboard*, to contain reading books, copy books, slates, &c.

13a. *School Library Cupboard*. It would be of little use to teach the art of reading, unless a taste for reading were also implanted in the children. In order to encourage this taste, the Board have established libraries from which the children may choose books to read. The schools of the Board are divided into a number of groups. A complete library is allotted to each group. The library is divided into as many sets as there are schools in the group, so that the sets may circulate amongst the various schools. Printed catalogues are provided for each set, and are hung up in the schools. Cards are issued to the children, containing ruled spaces for entering on the one side the book, or books which the child desires to read; and, on the other side, the book borrowed. The books for the school libraries are as far as possible purchased in sheets, and are stoutly bound in waterproof cloth.

Each school is also furnished with a small reference library, for the use of the teachers. A specimen library is shown on the lowest shelf.

13b. *Museum Cupboard*.—This is intended to contain collections of natural objects, &c., made principally by the teachers and scholars in their holidays, or at other times, or by gifts from managers. The various objects are used for instruction in object lessons, elementary science lessons, for illustrating reading lessons, &c. [See hereafter, D (f) and D (n).]

14. *Swing Slate*.

15. *Blackboard and Easel*.

16. *Ground Glass Wall Tablet.*

This exhibit is being tried as an experiment in some of the board schools, as an alternative to the ordinary *swing slate*. The tablet consists of glass, of which the front is ground and the back coloured black. It is believed that the writing upon this tablet can be more clearly seen from all parts of the class-room.

16a. *Ditto as a Swing Tablet.*

17. *Attendance Board*, for registering the attendance of each class at each opening of the school.

17a. *Time Table*, setting out the subjects and times of instruction.

18. *Honour Board*.—This is intended as a record of any distinctions obtained by scholars who have been in the school. The board exhibited is about to be placed in the Thomas Street, Limehouse, Girls' School. In connection with this subject, it may be stated that various City Companies and private donors have placed at the disposal of the Board 138 scholarships in all, which is on the average about twelve scholarships a year, since the time when the first scholarship was established in 1873. The object of these scholarships, which, with few exceptions, are open to children in all public elementary schools, is to enable children to pass from an elementary school to a school of a higher grade. They are generally tenable for three or four years, and have an average annual value of from £20 to £40 a year.

18a. *List of Scholarships* placed at the disposal of the Board.19. *Ink-well Cupboard*.—Each tray is numbered, and is assigned to a particular class.19a. *Filter*.

The four following exhibits are hung up in all the schools of the Board:—

20. *Sections 7 and 14 of the Elementary Education Act of 1870*, which define a Public Elementary School and a Board School.

21. *Regulations of the Board in regard to Bible instruction and religious observances.*22. *Regulations of the Board in regard to infectious diseases.*23. *Duties of School-keepers.*24. *Eight-day Clock.*

D. SUBJECTS TAUGHT—BOOKS AND APPARATUS.

The subjects taught in the London Board Schools are confined, with the exception of the instruction of the Blind and of Deaf Mutes, to the subjects specifically recognised by the Elementary Education Acts, and by the Government regulations which are applicable to all Public Elementary Schools in England and Wales.

These subjects are as follow:—

Standard Subjects.—(a) Reading; (b) Writing; (c) Arithmetic.

Class Subjects.—Not more than two of the following subjects. (d) English; (e) Geography; (f) Elementary Science; (g) History; (h) [for Girls] Needlework.

Other Subjects.—(i) Bible Instruction; (j) Vocal Music; (k) Drawing; (l) Drill and Physical Exercises; (m) Kindergarten Exercises for Infants; (n) Object Lessons; (o) Special Instruction for the Blind and (p) for Deaf Mutes.

When the instruction is sufficiently advanced, boys and girls in the upper standards may also take not more than two *Specific Subjects*. The subjects most generally chosen are at present Mathematics (i.e. Algebra, or Euclid to Book II. and Mensuration), and Animal Physiology, in Boys' Schools; Animal Physiology and Domestic Economy (including Cookery), in Girls' Schools. Mechanics, Botany, or some other specific subject, is sometimes taken in lieu of one or other of the subjects mentioned above.

The Board, as a general rule, have availed themselves of the best books and the best apparatus produced by different publishers and manufacturers. In no case have they published any books of their own, but at their suggestion improvements have frequently been made both in books and apparatus. A list of the books and apparatus from which managers and teachers can choose, is shown in Exhibit No. 31.

The Exhibits enumerated below are a special selection from the apparatus, etc., in use in the Board's Schools. They are arranged in order, beginning at the door, round the North, East, South, and West walls.

STANDARD SUBJECTS.

(a) *Reading*.

32. Alphabet Box on Stand, containing sets of capitals and lower case letters, with frame for forming words and sentences.

33. Lessons on Letter forms. Six sheets mounted on three cards, with manual.

(b) *Writing*.

Swing Slates (No. 14), and Blackboards (No. 15) are used in connection with Copy Books (without-head lines) in various rulings.

Head line Copy Books are also largely used.

(c) *Arithmetic*.

34. Abacus, strongly framed.

CLASS SUBJECTS.

(d) English. (No Exhibita.)

(e) *Geography*.—This subject has been greatly modified in the New Code. It consists now of physical more than of political geography, and commences with the school premises themselves. It is taught principally by means of maps, first of the school and neighbourhood, specially prepared (generally by a senior scholar or pupil teacher), then of the division in which the school is situated, afterwards of London and its environs, and a variety of other topographical and physical maps.

35. Relief Globe, with extra iron stand.

36. Mariner's Compass.

See Maps Nos. 151, 152, 153, 154 (which hang above), maps generally and diagrams.

(f) *Elementary Science*.—This is a new subject, and as yet has not frequently been taken up in the schools, though the teachers are always expected to give some knowledge of the elements of natural history and physical science, in the form of object lessons. General instructions for the guidance of teachers in this respect have been issued, and diagrams, &c., are supplied.

37. Instructions to Teachers. See also Museum Cupboard, No. 13 b, above.

(g) *History*.—In connection with this subject see Historical Pictures, Nos. 179, 180, 181, over north mantel-piece.

(h) *Needlework*.—In no subject of instruction has more progress been made than in the teaching of needlework in elementary schools. The old plan was to teach each child individually, and the necessarily small amount of time that could be given to each scholar in an ordinary school was not sufficient to turn her out a good needlewoman. The increased size of the schools, which arose out of the great increase of attendance after the Education Act of 1870 was passed, led to a better classification of the children, and their collection in classes of the same standard under qualified teachers. A different method of instruction thus became necessary, and in 1878 the London School Board introduced, under the direction of Mrs. Floyer, the simultaneous class teaching of needlework, which is now in use in all its schools. The teacher, standing before her class, shews the formation of the stitches on a large demonstration frame, and then, calling up the children in turns to follow her example, elicits from the class most of the possible mistakes and omissions that require to be corrected or supplied. The whole class then practises the stitch till it is mastered. Cutting out is taught in the same way to a class simultaneously on the chequered blackboard, the lines of which correspond with the sectional paper the children hold in their hands. Measurements are accurately taken, decreasing or increasing, the size is practised, and the material is then marked out with inch tape and pencil before it is cut. In infants' schools, as a preliminary to the use of needle, cotton and thimble, needlework drill is taught, and the practice thus gained enables the children to commence their needlework with ease. To lessen the work of the teachers, the various pieces required for Government and test examinations are now supplied ready prepared to the schools, and as many as three millions of these will be sent out annually to the schools under the London Board.

38. Needlework Cupboard and Baskets.

39. Chequered Blackboard, with sectional paper, both showing a shirt drawn to scale.

40. Samples (4) of Demonstration Sheets.

41. Case of Implements.

42. Case of Teaching materials.

43. Government Examination Pieces, unworked.

44. Ditto worked in schools.

45. Samples of Garments, worked in schools.

46. Glass Shades (3), with dolls dressed by the children, from a Bermondsey school.

47. Cutting-out Table.

48. Needlework Table, with Demonstration Frame—patterns of darning and herring-boning.

OTHER SUBJECTS.

(i) *Bible Instruction*.—On the 8th March, 1871, the Board passed the following resolution:—

"That in the schools provided by the Board the Bible shall be read, and there shall be given such explanations and such instruction therefrom in the principles of Morality and Religion as are suited to the capacities of children: provided always—1. That in such explanations and instruction the provisions of the Act in Sections VII. and XIV. be strictly observed, both in letter and spirit, and that no attempt be made in any such schools to attach children to any particular Denomination. 2. That in regard of any particular school, the Board shall consider and determine upon any application by managers, parents, or ratepayers of the district, who may show special cause for exception of the school from the operation of this resolution, in whole or in part."

On the 26th July, 1871, they also passed the following additional resolutions:—“1. That, in accordance with the general practice of existing elementary schools, provision may be made for

offering prayer and using hymns in schools provided by the Board at the 'time or times' when, according to Section VII., Sub-Section II., of the Elementary Education Act, 'Religious observances' may be 'practised.' 2. That the arrangements for such 'Religious observances' be left to the discretion of the teacher and managers of each school, with the right of appeal to the Board by teacher, managers, parents, or ratepayers of the district. Provided always—That in the offering of any prayers, and in the use of any hymns, the provisions of the Act in Sections VII. and XIV. be strictly observed, both in letter and spirit, and that no attempt be made to attach children to any particular denomination." The Syllabus of Religious Instruction for the year 1884 is shown in exhibit No. 49. The selection of the prayers and hymns is left to the managers and teachers.

(j) *Vocal Music.*—*The introduction of Music Teaching in Board Schools.*—In March, 1871, the Board resolved that the art and practice of singing should be taught as far as might be possible in the Board Schools as a branch of elementary education. In the year 1872 it was decided that singing from notes should be taught, and the present singing instructor, Mr. Evans, was appointed to direct and superintend the music teaching. The Board also decided that either the staff notation or the tonic sol-fa should be used, whichever was preferred by the teachers, and that the parrot-like teaching of school songs by ear, should, as far as possible be discontinued.

No difficulty has been experienced about the two methods of teaching. When teachers understood that the board would not be satisfied with the children gaining a knowledge of musical notation only, but that they would expect them to pass the instructor's examination in sight-singing, &c. (such as is now required by H. M. I. in order to gain the full grant for music), the teachers elected to teach by the tonic sol-fa method and notation, and suitable apparatus was supplied for the purpose.

The instructor's chief difficulty for some time arose from the scarcity of teachers qualified to teach singing by note. To meet this difficulty, at the beginning of his work, he formed an evening singing class for the instruction of head and assistant teachers in the method adopted for school teaching. Most of the teachers availed themselves of the opportunity thus given once a week, not only to learn the method, but how to teach it successfully in their schools. Soon a number of teachers obtained a music certificate, and became good teachers of music. But the instructor finding that many teachers beginning in adult age to learn to sing from notes, would never make thoroughly efficient teachers of music, formed classes in different districts for pupil teachers, in order to increase the teaching power for music in the schools. For a few years more than one thousand pupil teachers met the instructor once a fortnight to learn to sing from notes, and how to teach singing themselves. These young teachers made very rapid progress, because of the favourable age for music at which they were learning, and were soon able to take a large share in the music teaching. Thus the teaching power for music was rapidly and largely increased in the schools.

Owing to the large and ever increasing number of schools for the instructor to visit, it became necessary to appoint teachers for the evening classes, to work under his guidance and superintendence. For some years it has been necessary every winter to form as many as ten classes for head and assistant teachers. All the music teaching in the Board Schools has been done without the aid of musical instruments of any kind, it being the decided opinion of the instructor that they would prove harmful rather than helpful. During this year, under the new code, beginning with May, 1883, most of the schools have passed in the Government examinations for note singing, and earned the full grant for music.

For six years the singing of the Board School children on the large orchestra at the Crystal Palace, has given the public an opportunity of judging of the style and manner of singing taught in the schools, and the attention given to the training of the voices.

Music teaching in Infant Schools.—The instructor has arranged for music teaching to begin with the youngest children in the infants' school. With them it is an act of listening and imitation. Music is taught, but not notation. The teachers' first work is to cultivate the ear and voice, and in doing this she is careful to sing herself with soft and pure tone, the children listening, and then imitating the teacher. She is also careful to avoid all extremes in pitch, so that there shall be no straining of the vocal organs. The babies' class, as it is called, is taught to sing the scale to the sol-fa syllables, giving the manual sign for each note themselves as they sing it. This and the singing of suitable action songs they very much enjoy. This application of Kindergarten principles to music teaching has been very successful.

In large infants' schools the singing is taught in four, five, or more divisions, and the work carefully graded; the two lower divisions, learning by imitation as above described, the others learning to sing the modulator, and from the manual signs given by the teachers according to the music syllabus.

In Boys' and Girls' Schools.—The organisation for music teaching in boys' and girls' schools depends upon the number of children in each standard. In some large schools each standard forms a separate division for music; in others, standards V. and VI., or IV., V., and VI. are not too many for one division. Care is taken that the divisions shall not be too large for teaching thoroughly.

Instruction in tune and time, &c., in each division is given according to the music syllabus;

and as this syllabus is in advance of the Government syllabus, the children should be well prepared for the annual examination of H. M. inspector in music.

Time given to Music Teaching.—The time allotted to music teaching is generally two half-hours per week. In infants' schools, and in the lower divisions in the boys' and girls' schools, short lessons of five or ten minutes, and one longer lesson of thirty minutes are often given, taking up the one hour per week.

The Instructor's Visits.—The instructor visits the schools periodically to assist the teachers by suggestions and hints on teaching and voice training, &c., and when necessary giving short model lessons himself: he also examines the work done, and reports to the School Management Committee the progress made in each department, the condition of the apparatus, the number of teachers qualified to teach singing by note, and the organization for teaching music.

Teaching by Staff Notation.—When the highest division in a school has passed successfully through the music syllabus by the tonic sol-fa notation, it is well prepared to pass on to the staff notation. The sense of time and tune having been firmly established, the children quickly master the difficulties of the staff notation, and sing from it intelligently and correctly. This plan of teaching both notations will soon be adopted in many of the schools, and the children will then leave school with a sound knowledge of music by the tonic sol-fa method and notation, and in many cases a sufficient acquaintance with the staff notation to render their subsequent work in music both interesting and progressive.

50. **The Modulator**, which in the tonic sol-fa notation takes the place of the staff in the ordinary notation.

51. School charts, in three sets, in the tonic sol-fa notation. These charts are used in the lower classes instead of books, and in the higher classes with books for additional practice.

52. Curwen's Companion for teachers of the tonic sol-fa method.

53. Music syllabus, drawn up for teachers' guidance.

54. Taylor's stave modulator.

55. Taylor's music sheets.

(k) Drawing.—The Board have always felt that Drawing is of great importance as an educational agent if taught in such a way as to develop accurate observation, to improve the graphic memory, and to give increased powers of description of an object. A sketch is often, indeed, the shortest and best description of the object. When drawing is interestingly and intelligently taught, children gain a power which helps them in other studies, notably in spelling, arithmetic, geography and science. The study of drawing has also a practical bearing on the after-life of scholars, since many operatives have to work from or make a drawing more often than they have to read or write a letter. All the schools under the Board are supplied with drawing materials, objects and copies. At least one specially certificated drawing teacher is on the staff of each school. With the view of extending and improving the methods of imparting instruction on the subject to large classes the following apparatus (Nos. 56 to 61c) has recently been introduced:—

56. **Glass Plane.**—With this is demonstrated the conditions on which a solid object is represented on a flat surface, and the difference that exists between the real and apparent form of such objects.

57. **Stand for Objects.**—Three objects of identical shape are placed on this in different relations to the eye, so that the tracing on the glass plane will reveal, supposing discs to be dealt with, the great variation in their apparent shape, one appearing as a circle, another as an ellipse, and the third as a straight line.

58. **Coloured Freehand Copies*.**—The colour makes the copy attractive to children, enables them to distinguish the form more readily, and induces a habit so useful to draughtsmen of looking at and comparing masses or spaces instead of simply observing outlines. In drawing a small portion only of one of these copies, a pupil does it with intelligence, as its use and connection with a scheme of ornament is seen.

59. **Hinged Black Board.**—The elementary principles of Solid Geometry are easily explained and realized by using the boards placed vertically and horizontally, and afterwards so as to form one plane in projecting a solid.

60. **Common Flat Objects.**—These are interesting freehand copies, because they are real. They may be also used as subjects from which to practise model drawing.

61. **Apparatus to teach the judgment at sight:—Length**—Rods, from 2 to 24 inches in length.

61a. **Proportion**—Ruler, with a slide, and markings for teachers' exclusive use.

61b. **Length and Breadth**—Frame with shutter marked for teacher.

61c. **Angles**—Disc with hands, and marked for teacher.

62. **Wooden Drawing Models**—Pyramid, Cone, Cube, Sphere, &c. By Miller. Set of 9.

63. **Vases (Red)** by Wedgwood. Set of 3.

64. **Ditto (White)** by Wedgwood. Set of 3.

65. **Set Squares**, for mathematical drawing.

65a. **Ditto**, Large size, for teachers' use on Blackboard, &c.

* These copies are in the Corridor.

66. Specimens of Drawing Copies, Freehand and Geometrical. (These are in the Corridor.

(1) *Drill and Physical Exercises.*—In November, 1871, the Board resolved “that it is highly desirable that means shall be provided for physical training, exercise and drill in public elementary schools established under the authority of this Board,” and the question of the physical development of the children in their schools has at various times occupied the attention of the London School Board. For some years, however, the only exercises available either for boys or for girls were the drill and extension exercises under the drill sergeant. These though admirable for securing precision of discipline and smartness of bearing, were practically useless as a means of developing the body in its various parts, being confined mainly to one set of muscles.

In 1878 the attention of the Board was called to Ling’s system of free standing exercises which were already in general use in Sweden, Germany, and other countries of the continent. The system is one well suited for elementary schools, as it requires no apparatus, and can be used in the ordinary schoolroom or playground. By systematised exercise of all the muscles in turn, it secures a harmonious development of the whole body, without violent exercise, and with a precision of movement as perfect as in any drill. In January, 1879, the Board, as an experiment, engaged Miss Löfving, one of the most competent of the Swedish teachers, to train the mistresses in the exercises, and to superintend their introduction into girls’ and infants’ schools. So beneficial was the system found to be to both teachers and children, and so popular with the latter, that Miss Löfving was further engaged for one year, and again for a third term. In the summer of 1881 a large number of girls, many of them from the poorest schools of the metropolis, went through their exercises at Beethoven Street School, before the Princess Louise and the members of the Board; and the excellent results there shewn in the improved physique of the children, led to the permanent appointment of Miss Bergman as Superintendent of Physical Exercises under the Board, Miss Löfving being unable to remain longer in England. The Board has this year determined to appoint a second Swedish lady to meet the large demand from its mistresses for instruction. On Mondays and Wednesdays of each week during June and July, between the hours of 12 and 1, Miss Bergman will have, in the East Central Court, a class of little girls from Board Schools, using the apparatus, as well as, performing the exercises without it, and will be ready to answer all enquiries on the subject.

Recently, through the generosity of Lord Brabazon, the Chairman of the Metropolitan Public Gardens, Boulevard and Playground Association, and others, a large part of the amount required for the establishment of a Swedish gymnasium, and for the engagement of a Swedish officer for six months to teach the school-masters, has been presented to the Board, and the gymnasium will shortly be at work at Crampton Street School, Lambeth. Captain Hadsum, the officer in question, is already holding classes of masters for the free-standing exercises. A similar gymnasium has been erected by private speculation in the Health Exhibition.

(m) *Kindergarten Exercises.*—In 1874 the Board first introduced the Kindergarten system into its infants’ schools, and appointed a lady trained in its work to promote the right understanding of its principles amongst the teachers. Evening classes were held for them in various parts of London to instruct them in the manipulation of the occupations most suitable for large classes, to give them an insight into the new views of child nature opened out by Fröbel, and to suggest how old methods may be gradually superseded by new. The present instructor (Miss Lyschinska) visits the schools to assist the mistresses in applying Kindergarten methods for the teaching of form and numbers and for the illustration of object lessons. Dexterity of hand, order and correctness of eye are stimulated, and all impressions which have been taken in passively are put to the test and corrected, when reproduced by the fingers in a variety of material. Such teaching as this is of great importance in elementary schools where the children lack, as a rule, the education of the nursery and of the mother’s chat, and the hours which might otherwise be weary ones for such young scholars, are made to pass happily and profitably.

70. Twelve Photographs of Board school children at Kindergarten exercises.

Toys.

71. Wooden Churn; and 71A. Glass Churn. To illustrate lessons connected with the natural history lesson on the cow.

72. Bedstead, with doll and bedding (to show children how to make a bed, nurse doll, &c.). The bedding was made by children of six and seven years.

73 and 74. Kitchen Dresser with Tea Service. These are to show children how to set the tea-things, to wash them, and put them in place.

75. Chest of Drawers. These are used to keep various doll’s things, made in paper folding lessons, to give children a taste for keeping things tidy.

76. Dust Pan, with brush. The children are taught to use it in the room, after lunch or after work.

77. Wooden Animals, to be used in building lessons.

WORK MATERIAL AND EXERCISES.

Weaving.—78. Box containing paper mats and strips, with needles.
 79. Frame and list for weaving.
 80. Samples of paper-weaving done by children.
 81. Sample of list-weaving done by children.
Pricking.—82. Pricker, Pad, Cartridge Paper, Chequered Paper.
 83. Specimens of pricking exercises done by children.
 84. Apparatus for copying and multiplying drawings (used also for sewing and drawing exercises).
Sewing.—85. Implements and Materials.
 86. Examples of exercises done by children.
Stick and Ring-laying.—87. Material in a box.
 88. Work done in schools.
Paper Folding.—89. Material for children and for teacher.
 90. Specimens of work done by children.
Fraying.—91. Remnants of Woollen Stuffs.
 92. Exercises done by very little children, and playthings made with the teacher's help.
Bead Threading.—93. Coloured Beads on string.
 94. Large Beads for teacher's use.
 95. Exercises done by children of three and four years in learning number and colour.

DRAWING MATERIAL AND EXERCISES.

96. Cardboard Models used as drawing copies.
 96a. Chequered Blackboard—for Drawings to be copied by the children on chequered slates, paper and books.
 97. Exercises done by children on slate and paper.

GIFTS.

98. Gift I., as used in Board Schools.
 99. Gift II., as used in Board Schools.
 100. Gift III., as used in Board Schools. 100a. Gift III., large size for teacher's use.
 101. Gift IV., as used in Board Schools. 101a. Gift IV., large size for teacher's use.
 102. Specimens of exercises, showing combinations of occupations, e. g. knitting with fraying, colouring with paper-folding, colouring with pricking, sewing with fraying, &c.
 103. An Aquarium kept in some schools: the children are led to care for its inhabitants, at the same time they bring shells and food for them and have lessons upon them. The occupations taken in different lessons are associated with the subject.
 104. Kindergarten Table, combining teacher's desk and demonstration table, with hinged top adjustable at any angle.

(n) *Object Lessons*.—The London School Board, in its original scheme of instruction, laid down the principle that the children during all their years' attendance at school should have some instruction in natural knowledge through object lessons. Specific directions in regard to this have been issued from time to time. At present it is expected that in all infants' schools such lessons should be regularly given, and that in boys' and girls' schools they should assume the form of "a progressive course of simple lessons, adapted to cultivate habits of exact observation, statement, and reasoning," though it is not necessary that the children should be present in it for the Government Examination. Great latitude, in fact, is given to the teachers as to the way in which they are to carry out these regulations; few schools as yet take elementary science as a class subject, and it is often the practice to make his objective instruction preparatory to some specific scientific subject which is taken in the upper standards. The Board provides a liberal supply of natural history and other diagrams, specimens of which are exhibited [*see hereafter, E*]; and the teachers are encouraged to get together illustrative collections, and to induce the scholars to bring objects of their own.

111. Natural History Collection, forming part of the School Museum at Park Walk, Chelsea, Boys' and Girls' Schools.

111a. Other collections, from the School Museum of the Bowman's Place, Holloway School.

If a promising commencement is made, the Board supplies a cabinet for their reception. One of these, with its miscellaneous contents, is exhibited. [*See Museum Cupboard, 13 b.*]

A box of small apparatus is also furnished to such teachers as desire to make experimental illustrations, the importance of which is strongly urged by the Board. *See 112. Apparatus for simple experiments.*

It is considered desirable that the teaching of other subjects should also be given, wherever practicable, not so much from books as from the actual things themselves, or pictures of them.

113. Myers' Pictures of useful Plants, set of 12 cards in portfolio.

114. Bacon's Pictures, Lessons of Natural History, specimen of a series of 18.

115. Illustrations of Hey-Speckter's Fables—Natural History and Rural Scenery, set of 9 mounted together as a picture roll.

(See also Instructions for Teachers, No. 37, above.)

(v) *Instruction of the Blind*.—The Board in 1871 decided to put into force their powers for compelling children to attend school; and it was not long before the visitors, in the exercise of their duties, met with a number of blind children for whom there was no proper school provision. In April, 1875, the Board appointed an instructor, who, with an assistant, did what was possible for the blind children until the year 1879; when the Board decided to engage Miss Greene, who had been trained at the Royal Normal College at Upper Norwood, as superintendent of the instruction of the blind.

The following paragraph, taken in substance from a report of the British and Foreign Blind Association, will explain the grounds upon which the Board have adopted the apparatus now in use:—

Embossed printing was first introduced in Paris by Valentin Haüy in 1784. The character adopted was naturally the Roman letter, as being that to which he was accustomed. Mr. Gall, of Edinburgh (1827), and Mr. Alston, of Glasgow (1837), subsequently printed books, using modifications of the Roman letter. Then two shorthand systems were introduced—one stenographic, by Mr. Lucas (1837), the other phonetic, by Mr. Frere (1837), both of whom used arbitrary characters. A modification of the Roman type, including the use of both capitals and small letters, was first embossed in 1838 by Mr. Dawson Littledale, and is adopted in printing for the blind at Worcester. Finally, Dr. Moon (1847) introduced the system which bears his name. He aimed at greater simplicity, and used but few abbreviations. He employed Roman letters whenever their form was sufficiently simple to be easily distinguished by touch, while in other cases he adopted the simple line characters by Mr. Frere. Books were printed in all these systems, but none of much importance, except the Bible. The managers of each institution adopted the system of which they had heard most favourably, and proper school books scarcely existed, because it was not worth while to print books which could only be used in one or two schools. Moreover, to all these systems attached the serious defect that they could not be written.

The system introduced (1834) by Louis Braille, in Paris, is the only one (except the New York Point, used in some American schools) which enables a blind child to write as rapidly as sighted children in ordinary school exercise, and also to read and so to correct what he has written. It is, therefore, indispensable where blind children share the instruction of the sighted, and has accordingly been adopted by the London School Board in its classes for the blind. Moon's system is also used for reading, as, in many instances, enabling a blind child to *read* sooner than if confined to Braille, in which the letters of the alphabet are learned by the process of learning to write them.

Details of the scheme for the instruction of blind children may be found in Exhibit No. 119.

120, 120a, 120b. Embossed Alphabets—Worcester (roman), Moon's and Braille Types.

121. Reading Book in Worcester (roman) Type.

122, 122a, 122b. Reading Books in Moon's Type, *with illustrations in relief*. These books were produced by Dr. Moon at the request of the Board, in order that the blind children in Board Schools might have books the exact counterpart, including the illustrations, of those used by their sighted companions. They are believed to have been the first *illustrated* school books for the blind ever published.

123. Royal Reader, First Standard, 1 volume, in Braille Type.

123a. Royal Reader, Second Standard, 2 volumes, in Braille Type.

123b. Royal Reader, Third Standard, 2 volumes, in Braille Type.

123c. Royal Reader, Fourth Standard, 3 volumes, in Braille Type.

124. History of England, 1 volume, in Braille Type.

125. Relief Maps, various.

126. Guides to Relief Maps, in Braille Type.

127. Relief Globe, 12 inch.

128. Braille Writing Frame and Style, with sheet of paper showing writing.

129. Arithmetical Board, with several rows of the Arithmetical Type used as figures.

130. Text Books: Geography, Grammar, &c.—Embossed in Braille Type by blind children in Board Schools.

(p) *Instruction of Deaf Mutes*.—It was stated in the last paragraph that the visitors, in the exercise of their duties, met with a number of blind children, for whom there was no proper school provision. Similarly there was found a number of deaf and dumb children for whom previously to the year 1874 no suitable instruction could be obtained, except in institutions supported by voluntary contributions. In September of that year, the Board determined to provide instruction for these children in the ordinary schools, and accordingly appointed an instructor (the Rev. W. Stainer), who had had 30 years' experience in teaching deaf mutes, to initiate a system of deaf mute instruction at the Wilmot Street, Bethnal Green, Board School. At first there were only five children in attendance; but this number

son increased. It was also found necessary to open at successive periods additional classes in different parts of the metropolis. There are now 230 children under instruction, who are assembled for instruction at eight centres in different districts of London.

As to the system of instruction, the first efforts of the Instructor were to teach the children to speak. They soon learned the sounds and some simple words: but in a few months the number of children increased threefold, and for a time no assistance could be obtained to carry on the "Oral" teaching—consequently as fresh cases flowed in the "Oral" teaching diminished and the "Manual" teaching, which is much easier, increased. However, as time went on, a supply of teachers on the "Oral" system became available, and that system was gradually adopted as the supply of teachers increased. In 1879 a class was placed in charge of a teacher, who had been trained at the College of the "Association for the Oral Instruction of the Deaf and Dumb," Fitzroy Square. Within the last two or three years, the Board have appointed only those teachers who are qualified to instruct on the "Oral" system, which is now adopted exclusively in all the classes of the Board.

Further and full particulars of this section of the work of the Board will be found in Exhibit No. 131.

132. *Hill's Pictures of Objects*.—Pictures of objects are found to be a necessity to the teacher who has to give simultaneous instruction to a class of deaf children. The above named series is used extensively on the Continent. The 24 sheets contain 384 coloured illustrations. The author of these says: "The pupil must not be allowed to dwell upon the picture alone, but his attention must be directed to similar objects and circumstances in his own surroundings, in other words—he is to be made to understand the living world in which he finds himself, and to a proper understanding of which the picture is only to be used as a help."

132a. *Hill's Pictures*, bound and indexed for teacher's use.

133. *Object Lessons*.—These lessons are used in connection with the Object Pictures, being a literal translation of Hill's "Language and Reading Book," and forming a handbook to his series of pictures. In addition to the lessons it contains a description of the illustrations and an index of reference to about 2300 of the principal words found in the lessons.

134. *The Air Bag*.—The air bag, with mouth piece, is in constant use for the purpose of increasing the breathing power so often defective in deaf children, through the lungs not having been brought into operation for the purpose of producing voice in speaking. There are other means of accomplishing this, but in the schoolroom blowing through a mouthpiece, the effect of which is seen by the expanding of the bag, is found to be the most simple, amusing, and effectual means, especially for very young children, and there can be no better exercise for the lungs introductory to the production of sound and preparatory to vocal exercises.

135. *The Audiphone*.—This is an instrument invented for the purpose of superseding the ear trumpet used by those who are hard of hearing. Through the liberality of the inventor (Richard D. Rhodes, Esq., an American gentleman), in supplying instruments, free of cost, a series of experiments have been carried out with all the deaf and semi-deaf children attending the Board's classes.

136. *The Audiometer*.—This is an instrument, invented by Professor Hughes, by which the actual amount of hearing possessed by deaf and semi-deaf children can be exactly ascertained.

137. *The Circular Desk*.—It has been found practically impossible to teach deaf and dumb children along with the ordinary day school scholars. Special class-rooms have therefore been provided and fitted with circular desks after the pattern of the school at Richen, near Basle. The desk exhibited is an improvement on those in use at the present time. One section of the desk is intended to accommodate three children; two sections to accommodate six children: three sections to accommodate nine children, and four sections to accommodate 12 children. Thus a class of 12 children may be split up into divisions according to the composition of the staff—whether one teacher with one, two, or three pupil teachers.

137a. Drawings showing the varying arrangement of the Circular Desk, as above.

SPECIFIC SUBJECTS.

The specific subjects are additional subjects of instruction for children in Standards V. VI. and VII. They are not obligatory; and no child may be examined in more than two of these subjects. The Government Code gives a considerable choice, including sciences and modern languages; but those most frequently selected by the teachers of the London Board Schools are Algebra, or Euclid, and Mensuration, and Animal Physiology in boys' schools, and Domestic Economy (including Cookery) and Animal Physiology in the girls' schools. Some schools take Mechanics, Botany, or some other scientific subject. The instruction is as far as possible by means of diagrams, models or experiments; and as some of the apparatus is expensive, it is supplied on loan from the Board's Store for a limited period to any school that requires it. From this loan collection there are exhibited models of parts of the human frame—a torso (No. 142), eye (No. 143), larynx (No. 144), and heart (No. 145). Here are also exhibited some enlarged models of plants, with moveable parts (No. 146), and a box containing specimens of various woods (No. 147).

With reference to Cookery, which, by the Government Code, is included in Domestic

Economy, the first suggestion that the teaching of this subject should be introduced into the girls' schools under the London School Board, was made by Mr. John Macgregor, in January, 1874. In 1876 two class-rooms were opened in which instruction in Cookery was given to female pupils, and two more were added in the following year. In 1878 a more comprehensive scheme was adopted. It was decided to build cookery class-rooms, technically called "centres," in the playgrounds of convenient schools in which pupils from the Board Schools, within a certain distance of the Centre were to receive instruction in cookery. The first of these class-rooms was erected at the Stephen Street School, Edgware Road. At the present time there are thirty such class-rooms, while more are building or projected. In addition to this, in four schools, so near the boundary of the School Board area as to be beyond the range of any centre, Cookery is taught in one of the class-rooms fitted up for that purpose. In 1882 the Committee of Council on Education recognised practical cookery as a subject for instruction, and offered an annual grant of 4s. for every girl who, having attained the age of twelve years, should receive forty hours' instruction in cookery during her school year. In the code for this year the limit of age is taken away, but the grant is restricted to girls who have reached the fourth standard. The cooking staff consists of one superintendent (Miss Matthews), with an instructor and a kitchen-maid for each centre. At the present time there are more than 6,000 girls on the roll for cookery instruction. This represents about half the number who receive instruction during the year. The average attendance is about 80 per cent.

The Cookery class-room measures 21 feet by 18 feet, and is shewn upon the plan exhibited, No. 148. A class of 30 pupils can be taught at one time. The fittings consist of:—1. A counter with gas stove in centre. 2. Two fire-place openings, one fitted with an American range, and the second with an ordinary kitchen range, with oven and boiler. 3. A dresser. 4. A wash-up with sink. 5. A gallery for the pupils. 6. A cloak room. The cost of each class-room is £270.

The syllabus of cookery lessons will be seen in Exhibit No. 149. It is proposed shortly to show, from time to time, a Board Cookery Class under instruction in a neighbouring room.

E. MISCELLANEOUS EXHIBITS.

Careful attention has been given by the Board to the various objects with which the walls of its school-rooms are hung. The best maps of every description, political, physical, orographical or outline, are chosen. A large variety of astronomical, botanical and physiological diagrams, and representations of trees, plants, animals, manufactures and trade, machinery and the properties of bodies, are supplied, but till lately it was difficult to find any pictures possessing much artistic merit at a reasonable cost which could be hung on the walls of the schools. This was particularly the case with religious pictures, which as produced for this purpose are almost invariably of an inferior description. To meet this want some good cheap engravings of the old masters, such as Raphael's Paul and Barnabas at Lystra, Poussin's Eleazar and Rebecca, Raphael's St. Michael, his allegorical figures from the Vatican, the Two Children by Luini, &c., have been procured from Paris, and largely supplied to the schools. A great impetus has been given to the decoration of school walls by the exertions of the Art for School Association, and the Board has adopted many autotypes from the Old Masters, engravings from Sir Joshua Reynolds' portraits of children, and historical and other pictures from their collection. It is much to be desired that artists would turn their attention to this subject, and would produce at a reasonable rate good engravings in colours of country pursuits, which are especially attractive to town children. Such pictures of very small size procured from Paris are in use in the Board's Schools as reward cards, together with cards of flowers, fruits and vegetables. See 201 and 201A, hereafter.

N.B.—The Maps, Diagrams, and Pictures are in each case arranged in consecutive order, starting from the doorway, and passing round the West, North, East, South and West walls. Some are also to be found in the Corridor.

Maps.

151. Plan of a Board School (Pritchard's Road, Hackney). Drawn in the School by an Assistant Master.
152. Map of the Immediate Neighbourhood of a Board School (Victoria Road, Starch Green) Scale, 6 feet to a mile. Drawn in the school by a pupil teacher. This is one of a number of maps for the drawing of which prizes in value from 5s. to 20s. and amounting to £33 10s. in the aggregate, were awarded to scholars and pupil teachers by the Board.
153. Map of a School Board Division (Tower Hamlets), coloured in parishes, and with Board schools marked in red.
154. Map of London, shewing the School Board Divisions. Scale, 3 in. to a mile.
155. Stanford's Stereographical Map of the British Islands.
156. Stanford's Orogographical Maps, edited by Professor Ramsey—Asia. Specimen of a series of seven maps.
157. Blackboard Map of England, by L. Suzanne. With blackboard surface on the reverse

158. Philip's Map of Middlesex: showing parishes, poor law unions, metropolitan boroughs and Board of Works districts.

159. Physical Map of the River Basin of the Thames. By T. Ruddiman Johnston.

159A, B, C, &c. Other Maps which will be found in the Corridor.

Diagrams.

160. Geographical Pictures, designed by Ciceri, under the direction of M. Félix Hément. Specimen of a series of 12.

161. Collins's Diagram of the Points of the Compass.

162. Hachette's Illustrations in Natural History—Domestic and Wild Animals, Birds, Insects, and Fishes. Specimens of a series of 50.

163. Jarrold's coloured illustrations of the Animal Kingdom, scientifically arranged according to class, order, sub-order, &c. Specimen of a series of 12.

164. Rowney's Sepia Studies of Animal Heads, after Sir Edwin Landseer, and by N. H. Long. Specimens of a series of 9.

165. Moffatt's pictures of the Vegetable Kingdom—Trees. Specimen of a series of 8.

166. Moffatt's Pictures of the Animal Kingdom. Specimens of a series of 9.

167 and 167a. Pictures of Sunflower and Foxglove. (Art for Schools Association.)

168. W. & A. K. Johnston's Illustrations of Botany. Specimen of a series of 4.

169. W. & A. K. Johnston's Illustrations of Natural Philosophy. Specimen of a series of 4.

170. Leutemann's Diagrams of Animals. Specimens of a series of 39.

171. T. Ruddiman Johnston's Astronomical Illustrations—The Tides, Seasons, &c. Specimen of a series of 6.

172, 172A, B, C, &c. Other Diagrams, which will be found in the Corridor.

Pictures.

175. St. Michael, Raphael. Engraving.

176. Elephant. Photograph by Dixon.

177. St. Catherine, Raphael. Autotype.

178. Study for Miraculous Draught of Fishes, Raphael. Photograph.

179. Princess Elizabeth, J. E. Millais. Mezzotint.

180. Princes in the Tower, J. E. Millais. Mezzotint.

181. Portrait of Edward VI, Hans Holbein. Autotype.

182. Two Children, B. Luini. Engraving.

183. The Age of Innocence, Sir Joshua Reynolds. Engraving.

184. Simplicity, Sir Joshua Reynolds. Engraving.

185. Madonna del Gran Duca, Raphael Sanzio. Photograph.

186, 186a. Caldecott's Nursery Pictures. Coloured.

187. Rebecca at the Well, Poussin. Engraving.

188. Prodigal Son, Spada. Engraving.

189. Madonna Alla Seggiola, Raphael. Photograph.

190. La Belle Jardinière, Raphael Sanzio. Autotype.

191. Silver Birches, F. Slocombe. Etching.

192. Paul and Barnabas, Raphael. Engraving.

193. Miss Penelope Boothby, Sir Joshua Reynolds. Engraving.

194. Miss Bowles, Sir Joshua Reynolds. Engraving.

195, 195a. Raphael's Allegorical Figures from the Vatican. Two specimens of a series of 11 Engravings.

196, 196a, B, C, &c. Other Pictures, which will be found in the Corridor.

Specimens of Certificate and Reward Cards.

200. Certificate awarded on passing the Standards at Day or Evening Schools.

201 and 201a. Reward Cards awarded for regular and punctual attendance.

202. Certificates awarded by the London School Swimming Club, for proficiency in swimming. Swimming is not a subject recognised by the Code. A voluntary association was, however, formed in the year 1875, under the title of the "London Schools Swimming Club," to promote the acquisition of swimming by teachers and scholars attending any public elementary schools, whether Voluntary or Board. More than 18,000 of its members—teachers, pupil teachers, and scholars—male and female—have by means of the club been instructed in the art of swimming and have obtained facilities and opportunities for regular practice. The president of the club is Edward North Buxton, Esq., Chairman of the School Board for London, the Vice-Chairman is John MacGregor, Esq.; and the Secretary is Mr. F. Culmady Richardson, Bowling Green Lane, Ward School. The above is a specimen of the certificate awarded.

Science Teaching at Pupil Teachers' Central Classes.

203. Cupboard containing Science Apparatus for Instruction at the Board's Central Classes Pupil Teachers.

Drawings of Board Teachers.

204. Prize Drawings, executed by scholars and pupil teachers in Board schools.

205. Art Class Certificate Drawings, executed by teachers under the Board at the Saffron Hill School of Art since September last, and accepted by the Science and Art Department as of sufficient merit to satisfy the examiners.

[These two Classes of Exhibits will be on view later.]

F. INDUSTRIAL SCHOOLS.

The Board, besides being directed to supply their district with a sufficient amount of accommodation in Public Elementary Schools, are also empowered to put in force the Industrial Schools Act. Under this Act the Board have established three industrial schools, viz.: (a) an Industrial School at Brentwood for 100 boys; (b) the ship "Shaftesbury," off Grays, Essex, for 500 boys; and (c) a Truant School at Upton House, Homerton, for 60 boys. They have also entered into agreements with 57 industrial schools throughout the country, to receive cases sent to them by London magistrates at the instance of the School Board. Since the year 1871, 8,698 cases have been sent to industrial schools and training ships at the instance of the Board. During the year 1883, 887 cases were sent. These numbers include those children sent to their own schools as well as to other schools throughout the country.

The Brentwood Industrial School and the "Shaftesbury" Training Ship are ordinary industrial schools, to which children are sent by magistrates under the provisions of the Industrial Schools Act, who have been reported as falling under one or the other of the following categories:—
(a) A child apparently under fourteen years of age—(1) Found begging or receiving alms, or in any street or public place for that purpose. (2) Found wandering, and not having any home or settled abode. (3) Found wandering, and not having proper guardianship. (4) Found wandering, and not having visible means of subsistence. (5) Found destitute and being an orphan. (6) Found destitute, and whose surviving parent is undergoing penal servitude or imprisonment. (7) Frequenting the company of reputed thieves. (8) Lodging or residing with prostitutes, or in a house resided in or frequented by prostitutes. (b) A child, apparently under twelve years of age—(9) Charged with an offence punishable with imprisonment, or any less punishment, but who has not been convicted of felony. (c) A child apparently under fourteen years of age—(10) On the representation of parent, step-parent, or guardian, that he is unable to control such child.

The Truant School at *Upton House*, is also a Certified Industrial School, but it is restricted to children who are sent under the Elementary Education Act of 1876 for persistent truanting. In these cases the children are licensed out, on an average after 10 weeks' detention, on condition that they attend an ordinary elementary school; and if they satisfy the terms of their licence, they are finally discharged at the end of twelve months from their committal. Where the child breaks the terms of his licence, his licence is revoked, and he is brought back to the Truant school. It may be added, that the Board are reorganizing the Upton House School, so as to accommodate 100 children.

211. Training ship "Shaftesbury."

212. Band of ditto.

213. Officers of ditto.

214. Mess Deck of ditto.

215. School Deck of ditto.

216. Band of Brentwood Industrial School.

217. Ground plan of Upton House Truant School, now being rebuilt.

218. West elevation of ditto.

219. East elevation of ditto.

1560. INSTITUTE OF THE BROTHERS OF THE CHRISTIAN SCHOOLS.

—This Institute was founded in France in 1680 by the Venerable J. B. De La Salle, Doctor of Divinity and Canon of the Metropolitan Church of Rheims.

Foundation of the Society.—Devoting his energy to the improvement of the moral and intellectual condition of youth, he gradually effected important changes in the educational methods of the times. Notwithstanding much opposition from some of the scholastic leaders of the day, he succeeded in establishing public Primary Education in France, founding for this purpose a Society of Teachers, viz., the "Brothers of the Christian Schools," whom he required to make the vernacular tongue the basis of their instruction instead of the Latin which, till that time, had been the language of the schools.

Schools founded by La Salle.—He it was that first opened schools (Training Colleges) for the formation of masters, no less than five having been organised by himself. He also founded schools (Technical Schools) for the specific object of giving instruction in the more important contemporary industries. He likewise took the initiative in establishing the first Industrial Schools, for which he drew up special programmes of study; and, lastly, he founded, under the name of "Christian Academies," Sunday Schools for giving young men

gratuitously a sound knowledge of Christian doctrine. To this were added free courses in Mathematics, Drawing and Architecture. These few facts* shew that La Salle thoroughly realised the educational wants of his age, and claim for him no inconspicuous place in the history of education.

The Brotherhood numbers, at present, over 11,000 members, distributed as shown on the large Map of the Institute which is placed opposite the Grand Staircase, and also in the following

STATISTICAL TABLE.

Countries.		Houses.	Brothers.	Pupils.
France & Colonies	...	953	8,838	248,307
United States	...	70	698	26,338
Belgium	...	44	554	19,710
Canada	...	26	273	10,190
Italy	...	22	304	6,209
Spain	...	14	82	4,751
South America	...	11	77	3,820
Turkey	...	9	78	1,993
England	...	7	62	1,774
Egypt	...	6	122	2,306
Austria	...	6	82	1,659
India	...	5	52	1,391
China	...	2	16	352
Totals	...	1,175	11,233	328,800

Schools of the Brothers.—In France, the Brothers have a large number of Public Elementary Schools, Private Day Schools, Boarding Schools, as well as Technical and Agricultural Schools. In Belgium, besides ordinary schools and Colleges, they direct Art Schools and Training Colleges. In the United States and Canada they have numerous schools, Academies and Colleges. The Brothers everywhere follow the same general methods of teaching,† modifying, however, the details according to the customs of the country in which they are, and also varying their programmes to meet local requirements and the wants of the times.

Text Books.—In several countries, they have published complete series of text-books for use in their elementary and higher schools. These may be seen and examined both in the Brothers' section of the Exhibition and in the Library. In France, they have published a series of 15 volumes on Mathematics and kindred subjects, e.g., Trigonometry, Descriptive Geometry, Surveying, Theoretical Mechanics, Physiography, &c. They also exhibit their books on Geography, History, and the French language, their methods for learning foreign languages, together with the books and appliances devised and used by them in the Deaf and Dumb Schools which they direct at St. Etienne and Besançon. The Brothers in the United States and Canada have sent a complete set of their school books, and some of their works on School Government, Literature, Logic, Book-Keeping, and Commercial Law. The books published by the Brothers in Belgium, will be found in the Belgian Annexe.

Maps.—The Maps and Atlases made and exhibited by Brother Alexis have this peculiarity, that they were the first hypsometrical maps published in French. They are intended to give, by a suitable arrangement of colours, clear notions of the real configuration of the earth's surface. To these are added models in relief, some of which show the topography of certain places, such as Quebec, Montreal, Langres, and the Côte d'Or, whilst others are intended to illustrate the elementary definitions of physical geography.

Drawing.—Among the Fine Arts exhibits, the Brothers in France show their books on the various kinds of drawing, as also corresponding charts, diagrams and models in the flat, which are supplemented by a large number of working models (wood and plaster) of masonry, stone-cutting, and architecture. A collection of the latter may also be seen in the Educational Department of the South Kensington Museum. The work of the students will be found in a large number of albums and portfolios, which are so arranged as to facilitate inspection. There are also specimens of sketches of machinery made by the students when visiting large factories and engineering works, and field-books of compass and theodolite surveying, together with the corresponding plots and designs fully developed.

The Art Schools of St. Luke.—In the Schools of St. Luke at Ghent, the Brothers have inaugurated a comprehensive programme of Christian Art. The courses extend over a period of

* For particulars see in the Library "The Life and Work of the Ven. De La Salle," also "La Vie du Ven. De La Salle."

† See their books on Method and School Management.

seven years, and include not only drawing and painting, but also modelling, sculpture and architecture. The method followed differs essentially from that used in other countries and in the State Schools of Belgium. It originated with the Brothers, and was first applied by them in the Schools of St. Luke. Specimens of certain kinds of the work done, as well as three introductory volumes of the Course of Drawing, will be found in the Belgian Court.

Boarding and Collegiate Schools.—The Boarding and Collegiate Schools of the Brothers in Europe and America, are attended by 23,000 pupils. The courses of study usually give considerable prominence to such branches as modern languages and their literature, commercial subjects, drawing, the higher mathematics, physics, chemistry, and natural science. Some of their High Schools, particularly that at Passy, provide special classes for those of their advanced students, who intend to compete with candidates from Lycées and other Colleges throughout the country, for admission to the Paris School of Fine Arts and the Central School of Arts and Manufactures, whilst that of St. Etienne offers similar advantages for the School of Mines.

In America, some of their Colleges frame their curricula to qualify the students for academic degrees and honours. Their only College in England, St. Joseph's, Clapham, presents candidates for the Matriculation and subsequent Examinations of the London University.

Agricultural Schools.—The Agricultural Schools directed by the Brothers, are represented by the exhibits sent from l'Institut Agricole at Beauvais (France). Students over 17 who pass satisfactorily a preliminary examination, are admitted to follow the courses. These extend over a period of three years, and are not confined to the lecture-rooms, physical and chemical laboratories, and natural history museum of the establishment, but include systematic work on the model farm (370 acres) belonging to it. The students are also required to visit the best farms of the vicinity, to attend, with special professors, certain markets and sales of live stock, as well as to accompany the Brothers on frequently-appointed field-days for the practical study of botany, geology, and entomology. This school has students from most countries in Europe, and from America. See printed regulations and syllabus of subjects.

The New York Protectory.—The Technical schools conducted by the Brothers are represented by exhibits from the New York Catholic Protectory, from the School of La Salle at Lyons, and from the Schools of St. Nicholas at Paris. The Protectory was founded twenty-one years ago for the purpose of caring for destitute children of the city of New York, and instructing them in useful trades. The boys spend part of the day in the class-room and part in the workshops. Here they are trained by professionals in such handicrafts as chair-making, tailoring, silk-weaving, printing and electrotyping. Specimens of the work done in some departments are exhibited, as also photographic views of the Institution and of the several workshops.

The School of La Salle.—To this institution are admitted—free of expense—a limited number of the most successful students of the Brothers' Schools, at Lyons, who desire to acquire a theoretical and practical knowledge of the local industries. The courses include modern languages, political and social economy, descriptive geometry, plane trigonometry and its applications to surveying, experimental physics, organic chemistry, and the various kinds of drawing and industrial design. The students are afterwards admitted to the laboratories and workshops, in which they are instructed in analytical chemistry, modelling, cabinet-making, and especially in silk-weaving, an important local industry. On satisfactorily completing the course, they receive a Certificate of Proficiency.

The Schools of St. Nicholas.—The Schools of St. Nicholas are conducted on a large scale. Owing to the great number of applicants, there is keen competition for admission. The boys are put through a regular course of instruction, particular attention being paid in the higher classes to subjects specially connected with Technology. After finishing the course, many of the boys find employment in city establishments, whilst others remain to complete their technical instruction in the workshops of the Institution. In these, which are fifteen in number, they are taught various kinds of carving (wood, stone), engraving (on wood and metal), cabinet-making, and printing, as well as the construction of scientific instruments, such as microscopes, telescopes, levels, &c. The visitor may see in the Exhibition specimens of the work done in several departments. The cooking in this establishment is done by steam. There are also a steam-engine and a Gramme dynamo-electric machine for the purpose of lighting up certain workshops, large rooms and corridors. The physical and chemical laboratories are also fitted up with a number of Edison's incandescence lamps. The object of this installation is chiefly to afford means of practically training the students in the principles and engineering of electric lighting. St. Nicholas has branch establishments at Issy and Igny, with an aggregate of over 2500 boys.

School Museums.—The Boarding Schools of the Brothers in France and Italy, besides specimens of art and ordinary class-work, contribute a number of objects illustrative of local Natural History, which were collected by the students on field-days, and classified by the Brothers.

The largest comes from Annecy in Savoy, and contains a collection illustrating the geology, mineralogy, flora and fauna of the Department, as well as analyses of the principal mineral waters, and specimens of the local industries. Dreux has sent a number of small museums showing the successive stages in the manufacture of needles, combs, and the like, the making of *clocks and flutes*, as well as the processes of mirror-making, wood-gilding, &c.

Notes in Shorthand.—In some of their Higher Schools, the Brothers train the advanced students to make short-hand notes of their lectures; in others they themselves lithograph summaries of their lectures on science subjects. Specimens of such abstracts in Chemistry and Physics, are exhibited.

Exhibits from the United States, Canada, and India.—The Brothers in America and India, notwithstanding the short notice they received, have contrived to send specimens of work done in their schools of various grades. The visitor may inspect, *inter alia*, writing-books from Rangoon; day-books and ledgers from Quebec and Montreal; a pen-and-ink sketch of H.R.H. the Prince of Wales, and business forms of all kinds from the La Salle "Penman Club"; plans of canal and railway cuttings from Baltimore; plots and surveys from San Francisco; a local school-museum from Memphis (Tennessee); literary Essays from Academies in New York and Philadelphia; and Theses, in various languages, from Colleges at Manhattanville (New York), St. Louis (Missouri), and Rock Hill (Maryland).

Further information may be had from the Principal of the Brothers' London establishment, St. Joseph's College, Clapham, S.W. (Room No. 5.)

1561. CHARLES, A., Homes for Little Boys, Farningham and Swanley. Offices, Ludgate Circus, E.C.—(1) Models of School and Home Buildings. (2) Examples of School Work. (3) Specimens of work done by boys in Printing, Upholstering, Carpentering, Tailoring, Needlework (various). (Room No. 13.)

1562. RAGGED SCHOOL UNION.—*Origin and Objects of the Union.*—This Union, of which the Right Hon. the Earl of Shaftesbury is the President, was established in April, 1844, for the purpose of federating and assisting schools that were being gradually started for the benefit of the very poorest and destitute children of London and other large centres of population. At that time there were 16—of what soon became known as Ragged Schools, which the Union was instituted to foster. Ordinary day and Sunday schools had not reached the lower stratum of society, and to these the active voluntary workers of these Ragged Schools directed their attention.

Progress of Ragged Schools.—One of the earliest ragged schools in London was established in Grays Yard, north of Oxford Street, in 1835. Other schools of a kindred character must have existed before then, and many more were gradually established all over the country. In 1841 there was opened in Aberdeen a ragged school, in which the children were fed as well as taught, and from this example there sprang up "Ragged Feeding Schools" in various parts of the country. In 1847, Dr. Guthrie, of Edinburgh, published his first Plea for Ragged Schools, and opened one on the Castle Hill, which accomplished excellent results. A Privy Council Minute in 1856 sanctioned a capitation grant of £2 10s. for every scholar fed in these schools, but this grant was withdrawn in 1859, and has not been renewed, the whole of the expenses being met by voluntary contributions. The prominent object of Ragged Schools has ever been to act upon the moral and religious condition of the waifs and strays brought within their fostering care, and concurrently with this to promote habits of honesty, industry, and other principles of good citizenship. To this end Sunday night schools were established, which speedily became week-day night schools, and finally free day schools. Since the passing of the Education Act, 1870, the establishment of school boards has largely superseded the day school instruction of ragged schools, but has not in any way diminished the necessity for the other multifarious agencies having for their object the social, moral, and spiritual advancement of the children and their parents. Moreover the action of ragged schools on the well-being of the lower classes is still needful, by fostering habits of industry, temperance, and thrift, by providing penny banks, clothing clubs, &c., and by the exercise of vigilant supervision in the sanitary condition of their dwellings. It is estimated that nearly 400,000 children have been rescued from lives of vice and possible crime, and assisted to become honest, respectable citizens, by the ragged schools and missions connected with this Union.

Statistics of Ragged School Work.—The present work of Ragged Schools may be deduced from the fact that there are now as many as 39,273 children, receiving religious instruction in 209 schools, from 3278 voluntary and 193 paid teachers; that there are 130 week night schools, 90 children's special services, 71 ragged churches and mission services, 36 parents' meetings, 100 school libraries with 23,834 volumes, and 95 Bands of Hope and temperance societies. Breakfasts are, moreover, given to the destitute and, in addition, there are sewing classes, and classes for the teaching of drawing, fretwork, woolwork, carpentering, and brigades of various kinds. In 1851, the happy expedient was hit upon by some gentlemen connected with the ragged schools of reviving the practice of boot cleaning in the streets. The experiment was successful. The Brigade receipts during the Exhibition year are said to have reached £656, and since then the corps have been greatly multiplied, while their earnings now amount to thousands of pounds annually. A good deal is done by ragged schools in the way of recreation, by means of magic lantern entertainments, concerts, services of song, exhibitions of flowers and of objects of industry, and prizes are awarded for faithful service in situations, to say nothing of winter dinners and treats, as well as day in the country in summer. The latter scheme is

being widened, by giving some enfeebled children a longer stay in the country with manifest benefit. The question of reading is not overlooked, and much attention is given to training in industrial pursuits. A feature worthy of note in connection with Ragged Schools is the remarkable growth of separate agencies, some of which have been generally adopted. A report will be gladly sent on application to John Kirk, Secretary, Exeter Hall, London, W.C. (Room No. 18.)

1563. ROYAL ALBERT ASYLUM FOR IDIOTS AND IMBECILES OF THE NORTHERN COUNTIES, LANCASTER (per G. E. SHUTTLEWORTH, B.A., M.D., &c., Medical Superintendent). Secretary (from whom Reports and other information may be obtained), JAMES DIGGENS, Lancaster.

A. APPLIANCES FOR SENSE CULTURE USED IN THE EDUCATION OF IMBECILE CHILDREN.

In arranging the Exhibit in connection with this Institution, the leading idea has been to illustrate characteristic methods used in the training of the imbecile. No originality is claimed in respect of modes of teaching or of appliances shown, which indeed are now the common heritage of many kindred Institutions in various parts of the world.

Starting with the principle long since laid down by the late Dr. E. Seguin (the pioneer in this special work) that in Idiots and Imbeciles "the physiological education of the senses must precede the psychical education of the mind," and recognising with him the importance in the first instance of dealing with the sense of *touch*, we exhibit some simple appliances which serve to cultivate this sense, and at the same time to fix the attention and regulate muscular movements.

I. Bean-Bags, made of bright coloured material, are useful (1) to arrest the wandering gaze of the listless pupil, (2) to incite him when thrown at him, (a) to raise his hand to stop the bag, (b) to catch it in his fingers, (c) spontaneously to throw it back. Attention, common sensibility, reflex and voluntary muscular action are thus successively stimulated.

II. Peg-board, a board with perforations to be filled by pupil with metallic pegs, affords exercise for tips of thumb and fingers deficient in sensibility, and promotes due co-ordination of movements of the hand.

III. Pincushion with spotted cover. The pupil fixes ordinary pins into the spots, afterwards making simple design (as shown) with beads taken up on the pins. An excellent exercise for finer adjustments of thumb and fingers, defective in paralytic and other forms of Imbecility.

IV. Size and Form Boards, respective cavities in which are to be filled the corresponding loose pieces. First an exercise of sense of touch; secondly of *perception* of size and form. (N.B. Names of forms not taught at this stage.)

V. Domino-boards. Used in pairs and handled by pupils in imitation of pair in hands of Teacher, who places them successively in different relative positions. A good exercise in grasping, imitation, and simple ideas of relation.

VI. Graduated Rods, divided by transverse marks into inches (1 to 12), are arranged in series (like steps) by pupil, who thus gains rudimentary ideas of dimension. They may subsequently be used to demonstrate objectively the simple rules of arithmetic.

By such exercises as those above described the imbecile pupil gains tactile sensibility and dexterity; at the same time the faculties of observation and imitation are quickened, and the intelligence is gradually awakened. Similarly, whilst in the use of the following simple appliances, the exercise of the sense of *sight* in the discrimination of colours is the primary object, other faculties are simultaneously called into play.

VII. Colour Cups and Balls, used to train and test the pupil in *perception* of colours (not in *naming* them), two only, black and white, being first shown, the others being gradually introduced to the pupil till he can fill all the cups appropriately.

VIII. Colour Cubes, used for similar purpose, pupil following teacher's lead in turning uppermost in succession the various colours.

IX. Colour Discs, useful in testing pupil's powers of matching colours.

The senses of *taste* and *smell* are to be exercised by contrasting impressions on those senses of substances similar in appearance; e.g. for taste, white sugar and salt; for smell, coffee and snuff, distinguishing odorous from odourless flowers, &c.

Hearing and Speech require also to be specially exercised. Music has peculiar attractions for the imbecile pupil, and often forms a stepping stone to speech. Vocalisation is thereby encouraged, and articulation gradually follows.

X. A Table found useful in testing and exercising the defective *articulation* of imbeciles is submitted.

Physical Exercises, specially arranged to combat physical infirmities, as well as drill of a simple kind set to music, are most important in the training of imbeciles, but cannot well be illustrated objectively here.

Passing to the second class of objects exhibited, viz.:

B. SPECIMENS OF SCHOOL-WORK PRODUCED BY IMBECILE CHILDREN;

It should be borne in mind that such specimens are chiefly remarkable as having been produced in spite of physical as well as mental defects in the pupils. Button-threading and bead-work have indeed been specially prescribed for patients suffering from spasmodic movements of the fingers; and some kindergarten employments, such as paper-weaving and picture-perforating, are also of service in such cases, incapacities being overcome by persevering effort.

I. *Button-threading* in series, as regards colour.

II. *Beads threaded* in series, forming exercises in colour and number. *Bead-work* by partially-paralysed children.

III. *Paper-weaving, Picture-perforating and embroidery, and Chequer-drawing*, by junior boys and girls.

IV. *Series of Drawings* (from Nelson's Royal Drawing Books) showing progress of imbecile lad, now aged 16.

V. *Series of Illuminated Texts*, showing skill in colouring, by imbecile lad, who when admitted six years ago (at age of 13) could not steady his hands to write or draw. (The original, from "Little Folks' Illuminating Book," is placed above pupil's copy in centre of sheet.)

VII. (a) *Pencil Drawing from Copy*, in 1878, and (b) *Original Freehand Design* (in 1884), by youth affected with spasmodic movements of fingers (*athetosis*), showing firmness acquired.

VII. *First Copy-books and Recent Letters*, showing progress made by imbecile pupils in writing and composition.

In a Training Institution for Imbeciles much of the school-work leads up to industrial occupation; for example, there are practical lessons in shop-keeping, bed-making, &c. We pass readily, therefore, to the third class of objects exhibited, viz.:—

C. SPECIMENS OF HANDICRAFT WORK PRODUCED BY IMBECILE CHILDREN.

I. *Garments (Plain Sewing and Wool-work)*, made by imbecile girls.

II. *Stockings, Scarves, &c.*, knitted by junior boys.

III. *Joinery-work*, by imbecile lads. (Trays, picture-frames, ink-stand, and fretwork; the two latter by an imbecile boy of 15.)

IV. *Boots* made throughout by imbecile lads; also hand-closed "tops."

V. *Garments* made throughout by imbecile lads (Tailoring Department).

VI. *Brushes* bored, filled, and finished by imbecile lads.

VII. *Door-mat* made by imbecile lad.

Much out-door work of a useful character is done by imbecile lads in connection with the garden and farm. Of the salutary effect of suitable occupation ample proof is furnished by the improved condition of the working patients in such Institutions as the Royal Albert Asylum; and apart from economic considerations, it may emphatically be said in connection with the education and training of imbeciles,

"From labour health, from health contentment springs."

(Room No. 13.)

1564. WESLEYAN EDUCATION COMMITTEE (Secretary, REV. DAVID J. WALLER), Westminster Training College, S.W.—The Wesleyan Education Committee was formed in 1840. The day schools classed as Wesleyan in England and Wales number 854, with an average attendance of 130,000 scholars. The Committee have established two training colleges, one at Westminster for masters (117 students being now in residence), and one at Southlands for mistresses (109 students being now in residence). The practising schools attached to these colleges have an attendance of about 1400 scholars. The specimens of work exhibited in the cabinets are mainly from the children in these practising schools. The following statement explains the most important features of the various exhibits—(1) A Cabinet of objects collected and arranged with special reference to teaching the descriptive and commercial geography of England and Wales; also apparatus for explaining the phases of the moon eclipses, seasons, and the planetary system. This apparatus is "home-made;" it is remarkably cheap and of more service for teaching purposes than the complex appliances generally in use. The cost is affixed to each article. The manufacturing industries of the British Isles are made attractive subjects of instruction, by taking the most important of them and representing as far as necessary the various stages in the processes of manufacture. The articles have been collected from firms throughout the country, and in almost every instance have been supplied free of expense. (2) The work exhibited from the Westminster Practising Schools comprises—(a) Simple apparatus made principally by the teacher for demonstrating "the heat course" of the New Code. Utility and cheapness have been the objects aimed at. The scholars' exercise books upon this course are shown. (b) Scholars' work in wood, brass, tin, and iron. This branch of employment has been in operation during the past year, and simple optical instruments, such as the camera, magic lantern, and kaleidoscope, have been made by the boys under the

teachers' supervision. (c) The drawings, examination papers, copy-books, &c., are ~~sa~~ of the work done in these practising schools. The apparatus for mental arithmetic ~~ext~~ in junior classes produces rapid calculation, and saves the teacher's voice. (3) The ex from the Southlands Training College and Practising Schools comprise—(a) A of photographs showing the premises of the College and Practising Schools. include views of the exterior of the college and its grounds, of the interior, showin lecture hall, class-rooms, corridor, dining rooms, and dormitories; and also views of interiors of the principal rooms of the girls' and infants' Practising Schools. (b) G plans: (1) the basement, showing students' model cookery kitchen, (2) ground floor College, (3) plan of the Practising Schools and playground. (c) Time table and stat showing the college course of training. (d) Time tables of the Practising Schools Some specimens of needlework, executed by students as part of their ordinary training. (f) Specimens of needlework executed by girls and infants attending the Practising Schools. These articles were prepared in the ordinary course of school work, and shown to H.M. Inspector at his visit in April, 1884. (g) Specimens of Kindergarten from the infants' school. (h) Exercise and other books illustrating the ordinary work schools. (Room No. 13.)

VAN MARKEN, J. C., JUN., *Netherlands Yeast and Spirit Manufac Delft, Holland*.—(1) Models and Diagrams illustrative of the teaching of practical n work for children who attend the school belonging to the manufactory; school for appre and teaching of handicrafts for boys who have left school honourably; gardens and playg for children; public examinations and exhibitions of flowers grown by children, and of c made by them. (2) A Table containing the results of the practical manual labour taught manufactory: objects of paste-board, carvings, plaitings and sawings, which the school boy girls have made at home in their leisure hours, and also specimens of joiner's and smith's made by the elder boys, the apprentices at the manufactory. (See *Netherlands Section, N Central Court.*)

HYGIENIC LABORATORY.

(*Annexe to City and Guilds Institute.*)

Director—PROFESSOR CORFIELD, M.A., M.D. (Oxon), F.R.C.P.

Chief Assistant and Demonstrator—Mr. CHARLES E. CASSAL, F.I.C., F.C.S.

Assistant—Dr. W. FRASER, San. Sci. Cert., Cambridge.

THIS Laboratory is designed to show, as far as is possible in a temporary building, the arrangements suitable for the examination, from a Public Health point of view, of water, air, foods and drinks, soils, disinfectants, sanitary appliances, and other articles of Hygienic interest. In front of the Laboratory proper is an ante-room in which are arranged cases of apparatus of various kinds for exhibition and use in the Laboratory, and also a model laboratory table.

Projecting into the ante-room and entered from the Laboratory is the balance room, which should be separate from the Laboratory, but is here merely a glazed compartment, so that the operations conducted in it may be visible to the visitors; the balances, lent by Mr. Oertling, are supported on a pier with a solid foundation of masonry to prevent vibration; most of these instruments are very delicate, being capable of weighing to the one-thousandth part of a grain with comparatively heavy loads on the pans.

On each side of the balance room, in the ante-room, is a table on which are placed microscopes with various specimens for examination.

In the body of the Laboratory are placed three working-tables with bottle-racks above them, and drawers and cupboards for apparatus underneath; and around the sides, tables for microscopic work and distillations, with shelves for apparatus and bottles containing reagents, a furnace with sand bath on the top for evaporating purposes, and two glazed draught cupboards in which operations producing fumes may be conducted; these cupboards are provided with flames in which jets of gas are burning in order to produce currents of air which convey the fumes outside the building; the laboratory tables are provided with appliances for the supply of gas and water, and with sinks, the waste pipes of which are connected with a stoneware drain discharging into an open trapped gully outside the Laboratory, and having an inspection opening with a ventilating pipe carried above the eaves, at its upper end.

The operations conducted in the Laboratory are sufficiently described in the handbook entitled "Public Health Laboratory Work," and consist chiefly in the examination by chemical, microscopical and other means of specimens of water and air with the view of determining the nature and amount of various pollutions, and the analysis of articles of food and drinks to ascertain their quality and to detect the presence and estimate the quantity of impurities and adulterations, also the examination of filtering materials and of disinfectants, and the detection and estimation of poisonous ingredients, as such as arsenic, in the colouring matters used for decorative purposes, clothing, &c.

Specimens of accurately graduated flasks, burettes, thermometers and other apparatus used in the operations conducted in the Laboratory may be seen in the cases and on the tables, and also in actual use.

BIOLOGICAL LABORATORY.

(Central Institution of the City and Guilds of London. Room No. 15.)

Director—W. WATSON CHEYNE, F.R.C.S.

The objects of this Laboratory are to show the minutest forms of plant life, especially those associated with disease, their life-history, and the methods of investigating them.

Some of these minute bodies are injurious to man, animals, and plants.

- (a) In man we have—The *Schizomycetes* of anthrax, glanders, tuberculosis, erysipelas, acute necrosis, typhoid fever, pneumonia, recurrent fever, leprosy, cholera, &c.
Actinomycosis, *saccharomyces albicans* (thrush), fungi of diseases of the hair and skin, &c.
- (b) In animals—*Mammalia*.—Bacteria of anthrax, glanders, tuberculosis, *septicaemia*, &c.
Actinomycosis, fungi of diseases of hair and skin.
Aves.—Fowl cholera, *aspergillus*, &c.
Pisces.—Salmon disease (*saprolegnia*).
Mollusca.—Disease of oysters.
Arthropoda.—Disease of crabs (*saprolegnia*), bees (bacteria), silkworms (micrococci), flies (*Empusa musca*), &c.

(c) In plants—Fungi of the diseases of cultivated plants: Rust, bunt, mildew, disease of potatoes, vines, coffee-trees, orange-trees, vegetables, &c.

Diseases of forest trees: Canker, rot, &c.

Diseases of corn, &c. : Ergot, &c.

Some are of use in the production of articles of food by causing fermentation ;—as alcohol (yeast), vinegar (*bacterium mycoderma*), sour milk (*bacterium lactis*), cheese (*bacillus of rennet*, *penicillium of Stilton*, *Roquefort*), &c.

Some are of use in decomposing dead animal and vegetable matters, as the bacteria of putrefaction.

Some fungi are edible, as *boletus*, *agaricus*, *cantharellus*, *moschella*, &c.

Some are poisonous, as *amanita phalloides* and *muscaria*, *boletus satanas*, *kelvella esculenta*, *scleroderma vulgare*, &c. &c.

In addition to the exhibition of many of the above-mentioned forms of fungi, the methods of cultivating and studying them will be shown; the methods of investigating air, water, and soil, with a view to determine the number and varieties of the fungi present; the methods of determining the effect of various reputed disinfectants on the life of these minute fungi; the methods of straining them and demonstrating their presence in the tissues; and apparatus for microphotographing.

Most of the bacteria shown here have been obtained from Dr. Koch's Laboratory in Berlin, as also several maps showing the prevalence of various diseases in different towns, &c. Mr. Plowright and Mr. Worthington Smith have sent a large number of specimens of diseases of plants.

The following have been good enough to lend to the Executive Council Apparatus for use and exhibition in the Biological and Chemical Laboratories:—

BAKER, C., 244 High Holborn, W.C.
BECK, R. & J., 68 Cornhill.
BECKER, F. E. & CO., 34 Maiden Lane, Covent Garden, W.C.
BREFFITT, E. & CO., 83 Upper Thames Street, E.C.
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POWELL & LEALAND, 170 Euston Road.
SWIFT, JAMES, 81 Tottenham Court Road, W.
TOWNSON & MERCER, 89 Bishopsgate Street, Within.
WIESNEGG, M., 64 Rue Gay Lussac, Paris.

The whole of the Working Benches, Tables, &c., in the Chemical Laboratory have been specially constructed and lent by

GEORGE M. HAMMER & CO., 370 Strand, W.C.

FRENCH SECTION OF EDUCATION
ORGANISED UNDER THE AUSPICES OF THE MINISTÈRE DE L'INSTRUCTION
PUBLIQUE ET DES BEAUX ARTS.

INTRODUCTION.

ELEMENTARY EDUCATION IN FRANCE.

THE principal dates in the modern history of Elementary Education in France may be reduced to the following:—1793, when the *Convention Nationale* elaborated and began to carry out a complete scheme of popular instruction, soon mutilated by the subsequent governments; 1833, when Guizot reorganised a real system of public teaching and a body of efficient public teachers; 1848, when Carnot, during a too short tenure of office, tried to make elementary education compulsory and to improve the position of the teacher; 1867, when M. Duruy, a well-intentioned reformer, reorganised the elementary schools for girls, and again ameliorated the situation of the teacher; 1879, when M. Jules Ferry, under M. Waddington's administration, was called to the Education Department, and introduced to Parliament a series of great bills which bid fair to completely remodel the national life of France, not only by insuring the instruction of the masses, but also by assimilating the primary studies in elementary schools to those of the lower forms in secondary schools, and thus preparing through the education of children the “rapprochement” of the classes of society.

The wide programme of popular education which had been sketched out by the National Convention, and resumed by the Republic of 1848, has been the basis on which French educators and legislators have worked since the definitive consolidation of the Republican Government in 1877. In less than five years nearly all that which had been dreamed of by the Conventionnels concerning primary education has been carried out with a remarkable logic in plan and an unparalleled liberality in expense. The money which neither the Liberals of the Restoration, nor those of the Monarchy of July, nor the *Corps législatif* of the Second Empire had been able or willing to find for popular education, the Parliament of the Third Republic has not feared to demand of the State and the municipalities seven years after a terrible foreign and civil war, when the burden of taxes levied to pay off the war contributions to the conquerors were still pressing heavily on the nation. One after another were passed, to mention only the most important, the law constituting a school building fund (*caisse des écoles*, law of 1 June, 1878); the law requiring clerical and lay teachers of both sexes to be provided with a certificate (*brévet de capacité*, law of 16 June, 1881); the law rendering elementary instruction free (*gratuite*, same date); and the law declaring attendance in primary schools compulsory (*obligatoire*, law of the 28 March, 1882).

It has been rightly noticed that this new system of educational laws bears the undeniably stamp of the French race. It is evident that they have been prompted by all the instincts and aspirations characteristic of modern France, her ambition of national unity, her belief in the possibility of gradually equalising the rights of all members of the Commonwealth, her greater confidence in man than in ecclesiastical corporations, and also her tendency to appeal to the State not only for encouraging and controlling, but also for actually founding all organisations connected with the public interest.

Leaving out the history of popular education, this notice will be confined to summarizing the present condition of primary education in France.*

* Several passages of this notice, which only expresses individual views, are borrowed by permission of H.M. Commissioners for Technical Education from their first report issued in 1882, and second report, 1884, 2 vols.

Primary education is given in the following schools:—I. Maternal and Infant Schools; II. Elementary Primary Schools; III. Higher Primary Schools and Manual Apprenticeship Schools.

INFANT SCHOOLS.

A. Écoles Maternelles.—The *écoles maternelles* (infant schools) formerly called Shelter Schools (*salles d'asiles*), the organisation of which is regulated by the Decree of August 2, 1881, aim principally, besides affording shelter to children too young to attend the primary school, at training after the Froebelian method, and at favouring the physical, intellectual and moral development of children without fatigue or constraint. Children are admitted in them from the age of two years and remain in them until seven. The training of children in infant schools includes:—(1) The elements of moral education, outlines of common objects, the rudiments of drawing, writing and reading, practice in speaking, the elements of natural history and geography, tales within the reach of children's intelligence; (2) Training the hand; (3) Singing, and graduated gymnastic movements.

"An *école maternelle* is not a school in the ordinary sense of that term; it forms a means of transit from home to school, it preserves all the gentleness and indulgence of home while initiating scholastic work and regularity. The success of a mistress in an infant school should not then be estimated solely by the amount of knowledge imparted, by the standard of education obtained, or by the number and duration of the lessons, but rather by the amount of good influences to which the child is submitted, by the pleasure with which it is taught to regard school, by the habits of order, propriety, politeness, attention, obedience and intellectual activity it has contracted, so to speak, while playing." Translation of Minute of 28 July, 1882.

Good health, a sight, hearing and feeling already trained by a graduated series of little amusements, childish but lucid ideas on what will later on be the primary instruction, a commencement of habit and disposition to listen and observe, such should be the acquirements of a child who leaves the maternal school.

The pedagogic organisation of these schools, and the plan of lessons between which time must be divided in them, have been determined by the Minute of July 28, 1882. (See cl. 47.)

Regulations for infant schools are drawn up by the *conseil départemental* in each Department, framed from regulations issued by the Minister of Public Instruction, with the assent of the *conseil supérieur*.

In every school which receives more than fifty children, the head-mistress (*directrice*) must have an assistant-teacher (*sous-directrice*). The head-teachers are appointed by the Prefect on the nomination of the Chief Inspector (*Inspecteur d'académie*), and are chosen as much as possible from among the assistants. They must be twenty-one years of age and provided with the *certificat d'aptitude à la direction des écoles maternelles*.*

Programme of the examination for this certificate.—1. Dictation, questions in arithmetic, elementary composition, drawing in outline on the slate. 2. Questions on the principles of moral education, reading, geography, history of France, simple questions in natural history and hygiene with application to object lessons. 3. Class teaching in an infant school, where the candidate takes the part of head-teacher during a part of the sitting and that of assistant-teacher during the other part.

The under-teachers must be eighteen years of age, and provided with the same certificate.

The training colleges for female teachers, besides providing teachers for the primary schools, are also intended to recruit the teaching staff of the infant schools (Decree dated 14 January, 1884).

Committees of lady patronesses, under the presidency of the *Maire*, may be formed in each parish (*commune*) where there are infant schools. The members of those committees of patronage are appointed by the Prefect on the recommendation of Chief Inspectors of the schools. The only duties of this committee are to see that the sanitary regulations are duly carried out, and also to see that funds or donations collected for the children are properly employed. There are lady inspectors of infant schools appointed by the Minister of Public Instruction and lady chief

* In 1883, there were 1,977 head-mistresses and 852 assistant-mistresses who were uncertificated, and of these 2,685 belonged to religious orders.

inspectors (*Inspectrices générales*) appointed by decree of the President of the Republic, on the nomination of the Minister. They must fulfill the conditions relating to age and qualifications, as prescribed by the Decree of August 2, 1881, art. 8, and the Minute of December 23, 1882. Special instructions concerning the construction of infant schools have been issued by the *Comité des bâtiments scolaires* (Bulletin administratif de l'instruction, 1882, No. 507, page 424).

Education in infant schools is free (law of June 16, 1881).

B. (*Écoles enfantines*).—There are two kinds of *écoles enfantines*:—1. Schools in the large towns, forming a transition between the *école maternelle* and the primary school. 2. In rural districts, schools taking the place of the *école maternelle*, and preparing young children of both sexes for the special primary school for boys or girls. They must be directed by lady teachers provided with a *certificat d'aptitude à la direction des écoles maternelles*, or the lower grade certificate (*Breret de capacité élémentaire de l'instruction primaire*) for the programme of education in the *écoles enfantines*. (See Law of 16 June, 1881; Minute of 27 July, 1882; and Circular of 28 January 1884.) For specimens of occupations and work of children in French infant schools, see especially Ville de Paris, and Inspection Académique de la Gironde.

PRIMARY SCHOOLS.

Elementary Primary Schools.—Every parish (*commune*) must maintain one or more primary schools (Law of 15 March, 1850, art. 36.) Every parish of 500 inhabitants and more is bound to have at least one public primary school for girls distinct from the boy schools (Law of 10 April, 1867, art. 1).

The number of public schools for boys and girls to be established in each parish is fixed by the *conseil départemental de l'instruction publique* on the advice of the municipal council (Law of 10 April, 1867, art. 2).

In parishes the population of which is under 400 inhabitants the schools are mixed, and may receive boys and girls together.

Education in public primary schools is free (Law of 16 June, 1881).

The pedagogical organisation of the primary schools and the plan of studies to be followed in them have been regulated and determined by the Minute of July 27, 1882. (q. r.)

Primary instruction is divided into three courses.

1. *Elementary* (lasting two years, for children aged 7 to 9).
2. *Intermediate* (*cours moyen*) lasting two years for children aged 9 to 11.
3. *Superior*, lasting two years, for children from 11 to 13 years of age.

The departmental council fixes the regulations of the schools in each department from the general instructions of the official regulations decided on by the education minister with the assent of the *conseil supérieur*.

In each course the children must receive a threefold training, consisting of : 1. Physical education. 2. Intellectual education. 3. Moral Education. (See cl. 48, *synoptic table*, showing the detailed organisation of primary studies, their objects, methods, and programmes.) The ordinary obligatory curriculum of intellectual instruction comprises reading, writing, arithmetic, the elements of the natural sciences, geography, history of France, drawing and music, and is strictly carried out in all the town schools and in many of the country ones.* Some of the schools have cabinets of minerals, botanical specimens, science and art museums, and nearly all possess graphic illustrations of physical and political geography, raw materials and manufactured products. The simplest of those illustrative collections (e.g. those of Deyrolle) are supplied gratuitously to the poorer communal schools by the Education Department. Instruction in manual work has of late been introduced into a considerable number of the primary schools. (See below Cl. 50, Ecole de la rue Tournefort, and 33 Ecole Normale Spéciale de travail manuel.) Almost all the primary schools of Paris and large towns (Lyons, Marseilles, Rennes, &c.) have workshops attached to them. Special inspectors of manual work have been appointed, who determine the quantity of work to be done and judge of its quality.

* A new inquiry into the teaching of drawing in primary schools and normal colleges, has lately been started by order of the present Education Minister, M. Faillières. See circulars and printed forms issued by the Department Central London and City Guilds Institute, Room 8.

The whole of the instruction in a class or division, as the case may be, is generally conducted in a separate room. The hours of instruction are from 8 A.M. to 4 P.M., with one and a half hour's interval at noon, and one hour from 4 to 5 for gymnastics. The same master gives all the lessons to a class, except music, gymnastics, and occasionally drawing, in the male, and needlework in the female schools. Pupil teachers, as assistants, are permitted by law, but the employment of them has been generally discontinued.

In many of the large cities the children take their dinners in the school. In some cases a kitchen is provided, and the whole or a portion of the cost of preparing the food is borne by the school authorities. In the poorer districts of Paris a portion of the cost even of the food itself is defrayed by the municipality, and in extreme cases the authorities provide boots and clothing for the children on the recommendation of the master.

Corporal punishment is strictly forbidden in French schools of every grade.

Primary instruction is compulsory for children of both sexes, including the blind and deaf mutes, from the beginning of the seventh to the end of the thirteenth year.

In every commune (there are about 36,000 communes in France) besides a school attendance board there must be a school board, composed of the mayor, of certain persons to be appointed by the inspector of the *académie*, of the inspector of primary schools of the department, and of a number, not exceeding one-third of the whole board, of persons elected by the council of the commune. (There are special provisions as to the composition of this board, in the case of Paris and Lyons.)

Children may present themselves for examination for the "*certificat d'études*" at the age of 11, and, on passing it, are to be exempted from further compulsory primary instruction.

PROGRAMME OF THE EXAMINATION FOR THE CERTIFICATE OF PRIMARY STUDIES.

This title belongs exclusively to the diploma conferred by the cantonal commissions, which commissions are appointed by the rectors of the académies, the names being submitted to them for the purpose, by the chief inspectors (*inspecteurs d'académie*) who meet every year, either in the principal town of the canton, or in some central commune, previously selected; the primary school inspector of the district being as a matter of course associated with them.

At the appointed date, and within the time prescribed by the chief inspector, every master or mistress prepares a statement for each school, giving a list of the candidates of both sexes for the certificate in question. This statement (which must not contain the name of any candidate who is less than 12 years of age on the 1st of October in the year in which the examination takes place) bears the name, Christian name, date, and place of birth, present residence, and signature of each candidate; it is counter-signed by the mayor and forwarded at the proper time to the primary school-inspector.

The examination for the certificate of primary studies is composed of both written and oral tests.

The written tests which take place with closed doors under the superintendence of the members of the commission comprise, 1st, a dictation of not more than twenty-five lines, which may at the same time serve as an examination in writing. 2nd, two questions in arithmetic, involving sums in calculation and the metric system with appropriate answers (*solutions raisonnées*). 3rd, a composition of a simple kind (story, letter, &c.) Little girls have, in addition to this, to do some plain needlework under the supervision of a lady who is selected for this duty.

Failure in any one subject excludes the candidate. The maximum number of marks obtainable being fixed at ten for each test, only those boys are permitted to take part in the oral examination who have obtained a minimum number of twenty marks (in spelling, writing, arithmetic, and composition); while girls must obtain at least twenty-five marks (in spelling, writing, arithmetic, composition, and needlework).

The oral tests, which take place in the presence of the masters and mistresses, comprise, 1st, explanatory reading; 2nd, the analysis of a sentence read out, or written on the black board; 3rd, the elements of the history and geography of France; and 4th, questions in practical applications of arithmetic and the metric system. Each of these subjects also may be marked from 0 to 10.

The marks awarded for the oral tests are added to those secured in the written examination, and no one is finally certified, as being qualified to receive the certificate, who has not received at least half the total number of marks obtainable in the two classes of tests; say a total of forty marks in the case of the boys, and forty-five marks in the case of the girls.

In addition to these subjects, the examination may include an exercise in outline drawing and questions in agriculture. Mention is made in the certificate of such supplementary subjects for which the candidate succeeds in obtaining not less than five marks.

No examination fees of any kind are payable.*

All children whose parents do not give notice that they are receiving instruction at home, or at a public or private school, which they must name, are to be entered by the *mairie* on the books of some public school.

Proper attendance-books must be kept by all schools, and absences reported by the head masters.

Private schoolmasters not attending to this regulation may be reprimanded or suspended by the departmental council.

In case of irregular attendance the persons responsible for the children shall be liable to be reprimanded, and, upon the repetition of the irregularity, to have their names posted on the door of the *mairie*. If the offence is again repeated the primary inspector shall summon the parent or guardian before the *juge de paix*, and he shall be liable to the punishments imposed on police offences by 479, 480, and the following articles of the *code civil*; article 463 is also applicable to them. Irregularity of attendance is defined as consisting of four absences in a month from one or both of the daily attendances.

The school board may, subject to the consent of the departmental council, exempt children employed in trades or in agriculture, from one of the two daily attendances.

Children therefore can only be employed as half-timers in trades and agriculture, under the age of 13, by the joint consent of the commune and of the department, unless, at or above the age of 11, they have obtained the "*certificat d'études*."

All children educated at home are to be examined annually by a committee selected by the inspector of the *académie*, and if the examination is not satisfactory the child must be sent to a public or private school to be designated by the parent.

Higher Primary Schools.—Those schools (Laws of 16 June, 1879, 27 January and 11 Dec. 1880, Decree of 15 January, 1881) consist of—1st, Course of one year duration annexed to primary schools and termed *cours complémentaires*; 2ndly, Of higher primary schools proper, having a special staff and comprising at least two years of studies. *For the programme of the higher primary schools* and of the *Écoles manuelles d'apprentissage*, see the Minute of January 15, 1881.

Competitive examinations for State Exhibitions tenable in Higher Primary Schools are held annually. The programme of these examinations comprises:

French composition, reading, with questions on grammar or parsing of a sentence, questions on authentic history, geography of France, moral and civil instruction. For the candidates of the 2nd series the examination includes dictation, composition, drawing, reading, with questions in grammar, parsing and analysis of a sentence, questions in arithmetic and plane geometry, French history, general geography, moral and civil instruction, and the elements of the physical and natural sciences (Minute of November 23, 1882).

All pupils having obtained a state exhibition (*Bourse de l'État*) are required at the end of their regular course of studies to pass the examination for the certificate of higher primary instruction.†

TEACHING STAFF.

Male and female teachers are appointed by the prefect, on the nomination of the chief inspector of public instruction (*inspecteur d'académie*).

* By decrees dated 16th of June, and the 24th of December, 1880, and circulars dated 27th September, 1880, and 27th January, 1881.

† In summing up their views on French schools the English Royal Commissioners on Technical Education, vol. I. 1884, remark that "gratuitous higher elementary, which includes technical instruction, is being extended in many of the large towns, and the sums devoted in the State and Communal budgets to the creation and maintenance of schools, have increased enormously. Instruction in the use of tools is now very general in the primary schools of Paris."

The appointments of assistant teachers (*instituteurs et institutrices adjoints*) must be approved by the prefect, they are nominated by the head-teachers, with the assent of the *inspecteur d'académie*.

There are two standards for primary education; the second grade or elementary certificate, and the first grade or higher certificate.

The candidates for an elementary certificate must be at least sixteen years of age. The examination includes, 1st, a page of writing, dictation or orthography, French composition, the solution of two arithmetical questions, and, for the girls, some needlework besides; 2nd, French and Latin reading, the analysis of a phrase, questions in arithmetic and on the metric system, questions on the elements of history and geography of France (Decrees of 4 January, 1881, and 7 July, 1882; Minute of 5 January, 1881).

Candidates for the higher certificate must have obtained the elementary certificate and be seventeen years of age. The examination includes, 1st, exercises in arithmetic and geometry and in physical and natural sciences, a paper on the French language and literature, or history, or geography, or moral or civil education, and a paper on drawing; 2nd, questions in the mathematical sciences, physical and natural sciences, history of France, general history and geography, the French language, singing and gymnastics. The subjects of this examination must not in any case go beyond the programme of education for the primary training colleges (Decrees of 4 January, 1881, 21 July, 1882; Minute of 5 January, 1881).

A new title complementary to the two certificates of capacity and called *Certificat d'aptitude pédagogique* has been created, in order to test more particularly the fitness of male and female teachers to the management of schools containing several classes. The conditions of competition for the certificate are: To be at least twenty-one years of age at the time of the examination; to have had for two years experience in teaching since the passing of the examination for the *brevet élémentaire*. The examination for the *certificat d'aptitude pédagogique* includes, besides an essay in French on school management and methods of teaching, an oral correction of school exercises, and a class teaching either on an object lesson or on moral and civic instruction, the French language, geography, history, arithmetic, or agriculture (Decree of 4 January, 1881; Minute of 5 January, 1881). School inspectors are particularly entrusted with the oversight of primary schools. School inspectors are appointed by the Minister of Education from among persons who have obtained a special certificate of fitness for those functions.

The examination for this certificate, for which women may compete, includes essay writing 1st, on a subject of pedagogy; 2nd, on a subject of school management, commenting on a passage taken from the text appointed to be prepared, &c., &c., and practical tests, consisting in the inspection of a class in either an elementary school or training college, with verbal report on it (Decree and Minute of 23 December, 1882). For the regulations concerning the construction of school houses see special instructions adopted by the Comité des batiments scolaires (bulletin administratif de l'instruction publique, 1882, No. 507, p. 430).

STATISTICS.

In 1882-83 there were in France 77,302 elementary primary schools for boys and girls, of which 64,510 were public schools, and 12,792 private. The number of public teachers was 129,657, of which 92,300 teach in public schools, and 37,357 in private ones. The number of pupils in 1882-83 was 5,432,151, of which 4,409,310 were in public schools and 1,022,841 in private schools. The general outlay of the State for primary education amounted in the same year to 94,881,942 fr. Whereas in 1867 the percentage of the conscripts who were unable to read and write was as high as 23 per cent., it has fallen in 1882 to 13.1 per cent. Of the 129,657 teachers in public and private primary schools, there were only, in 1883, 21,781 that were uncertificated (20,132 of whom belonged to religious orders). (See in *City Guilds Institution, Room 9*, the Statistical Maps of Education in France, exhibited by the Pedagogic Museum.)

TRAINING COLLEGES FOR MALE AND FEMALE TEACHERS OF PRIMARY SCHOOLS.

Every department must be provided with a training college for male teachers and a training college for female teachers, sufficient for securing the recruiting of the staff of national schools, (Law of August 9, 1879, art. 1.)

The training colleges for female teachers, in addition to training mistresses for national schools, train also teachers for maternal and infant schools. All have a primary school attached to them as well as a normal course for maternal schools.

There is, at the end of each academical year, a competitive entrance-examination to the training colleges in all departments of France and Algeria. Every candidate must be fifteen years at least, and no more than eighteen years, and must be provided with the certificate of primary elementary studies; he must engage to remain ten years in public tuition. Board and tuition in primary training colleges is free.

The entrance examination consists of five written ordeals, dictation, an exercise in handwriting, a French essay, the solution, supported by reasoning and proof of one or several questions in arithmetic and the metric system, a composition in drawing; of a *viva voce* examination, in which only those candidates take part who have gone successfully through the written ordeal; this includes the French language, arithmetic and the metric system, the elements of the history of France, geography, the recapitulation of a lecture given by a professor of the training college. Candidates, whether male or female, have also to pass in music and singing, and gymnastics, male candidates having besides to pass in military drill and exercises, and female candidates in sewing (Minute of Jun. 6, 1882). The course of studies lasts three years. The colleges, except in special cases, receive only boarders.

The course of education in training colleges includes 1st, moral and civic instruction; 2nd, reading; 3rd, handwriting; 4th, French language and elements of French literature; 5th, history, and especially French history up to the present period; 6th, geography, and especially that of France; 7th, arithmetic and metric system, elements of algebra and book-keeping; 8th, geometry, land surveying and levelling (for male teachers only); 9th, the elements of physical sciences with their chief applications; 10th, the elements of natural sciences with their chief applications; 11th, agriculture (for male teachers), domestic economy (for female teachers), horticulture; 12th, drawing; 13th, singing; 14th, gymnastics and (for male teachers) military drill and exercises; 15th, manual work (for male teachers), needlework for female teachers; 16th, pedagogy; 17th, (optional) one or more modern languages. The study of instrumental music may be authorised by the rector on the application of the directors of the colleges (Decrees of July, 1881 and January 9, 1883).

The directors and lady principals of training colleges are appointed by the Minister of Education; they must be provided with the *certificate of aptitude* for the management of training colleges (Decrees of July 29 and 30, 1881). This certificate is granted, after an examination to which are admitted all candidates who are at least 25 years old, and who are provided with the *certificate of aptitude* for a professorship in the training colleges, unless they are provided with the diploma of the *agrégation of the lycées*, or of Licentiate of Literature, or of Science, or of Bachelor of Arts and Bachelor of Science (mathematics and physical and natural sciences) combined; for the latter diploma may be substituted the diploma of bachelor of the *Enseignement Secondaire Spécial*. The examination includes an essay on a question of pedagogy, a composition on a subject of school administration, the explanation of a passage from one of the authors selected, the explanation *viva voce* of a question bearing on one of the points of a syllabus drawn up by the Minister of Education; finally, as a practical test, the inspection of a class of training college or of a primary school, and *viva voce* report thereon (Decree and Article December 23, 1882).

Instruction in training colleges is given, 1st, by professors appointed by the Minister, provided with the *certificate of aptitude* to a professorship in training colleges, either in the section of literature or in the section of science; 2nd, by assistant masters or mistresses, provided with the *brevet supérieur de capacité* (higher certificate) of primary instruction and of the certificate of pedagogic aptitude, and who have been appointed by the Minister; 3rd, by auxiliary professors and special masters, appointed or delegated by the Minister (Decree of July 25, 1883).

The certificate for aptitude to a professorship in training colleges is obtained after an examination, to which all candidates over 21 years old are admitted, who have been engaged at least two years in public tuition and are provided with the diploma of Bachelor of Arts or of Bachelor of Science, or of the *Brevet de capacité* (certificate of capacity) of the *Enseignement Secondaire Spécial*, or of the higher certificate of primary instruction. The written part of the examination

includes: 1st (in the section of literature) an essay on a question of literature, grammar, or history and geography, an essay on a question of psychology or ethics, an essay on a question of pedagogy. 2nd (in the scientific section) an essay on a question of mathematics and the execution of geometrical drawing, an essay on a question of physics, chemistry or natural history with their applications. an essay on a question of method applied to the teaching of science. The *viva voce* examination includes the correction, supported by reasoning and proof, of an exercise done by a student of a training college, and the reading, with explanations, of a page from one of the authors selected.

The practical ordeal consists in a lecture given to a division of students, on a question drawn by lot (Decree of June 5, 1880; Minutes of December 26, 1882, and July 20, 1883).

There are at present in France 86 training colleges for masters, and 57 colleges for mistresses in primary schools. Each college has three grades, and each grade contains as a rule 15 students; the total number of students in the training colleges is therefore about 6435.

HIGHER TRAINING COLLEGES FOR PRIMARY INSTRUCTION (ÉCOLES NORMALES SUPÉRIEURES D'ENSEIGNEMENT PRIMAIRE).

1st College at Saint-Cloud (Seine-et-Oise).—This college is destined to train professors for the training colleges of primary instruction (for male teachers) (Decree of Dec. 30, 1882). The course of instruction consists of the subjects taught in the ordinary training colleges. (Decrees of July 29, 1881; Jan. 9, 1883, and Minute of August 3, 1881.)

This college, open to boarders and day scholars, is entirely free, and has its students recruited by a competitive examination. The students are divided into two sections: science and literature. The entrance examination is held once a year. All candidates are admitted to it, who are not less than 20 nor more than 25 years old on the 1st of October of the current year, who have engaged to remain 10 years in public tuition, are provided with a medical certificate declaring their fitness for educational duties, and who are provided with the higher certificate of capacity of primary instruction, or of the degree of Bachelor of Arts, or of Science, or of the certificate of capacity of the *Enseignement Secondaire Spécial*. The examination consists of written papers and of *viva voce* questions. The written examination includes 1st (section of literature), a French essay, an essay on a question on French history, which may be accompanied by geographical questions, an essay on a question of pedagogy; 2nd (scientific section), an essay on a question of mathematics, an essay on questions of physics, chemistry and natural history, an essay on a question of pedagogy.

The *viva voce* examination consists of questions in reading, correction of exercises, explanation, after a short preparation, of a question set to the candidate. (Minute of Dec. 30, 1882.)

The course of study lasts two years, at the end of which the students are required to come forward to the examination for a certificate of aptitude for a professorship in training colleges of primary instruction.

2nd, College at Fontenay-aux-Roses (Seine).—This college is open to ladies only, and is intended to prepare lady-professors for training colleges of national school-mistresses. It may receive also, under specified conditions, students, already provided with the certificate of aptitude for a professorship in training colleges, who wish to prepare themselves for the certificate of aptitude for the directorship of training colleges. (Minute of Dec. 24, 1880.)

The college, which is entirely free, has its students recruited by competition. The students are divided into two sections, scientific and literary. Candidates must be either married or widows, be 20 years at least and no more than 25 years old on the 1st of September of the current year, possess the higher certificate of capacity of primary instruction, contract the engagement to remain ten years in public tuition, and produce a medical certificate declaring their fitness for educational duties.

The entrance examination is similar to that set for the students of the college at Saint Cloud. In the final order, special stress is laid on the knowledge which candidates may evince of the elements of the English and German languages. (Circular of May 8, 1884.)

The course of studies lasts two years, but will soon be extended to three years. (Circular of May 8, 1884.)

The syllabus of this college includes: 1st, a course of lectures on psychology and ethics applied to education, and the history and examination of educational systems; 2nd, the

subjects taught in training colleges of primary instruction ; 3rd, lectures given by the students and practical exercises in the college itself, as well as in primary schools, training colleges, etc. ; 4th (for the candidates who wish to become directresses of training colleges), a course of lectures on scholastic legislation and administration. (Minute of Dec. 24, 1880.)

The students are required, at the end of the course, to come forward for the examination for which they have attended the college lectures.

In connection with this college is the *École Pape-Carpentier*, established at Sceaux (Seine), which is intended to train mistresses and assistant mistresses for the normal courses of infant schools in connection with training colleges of national school-mistresses. The students of this school attend the lectures of the college at Fontenay-aux-Roses.

The school is entirely free, and has its students recruited by public competition. Candidates must be at least 20 years and not more than 30 years old, and possess, in addition to the certificate of aptitude for the direction of infant schools, the higher certificate of capacity for primary instruction, or the elementary certificate, completed by the certificate of pedagogic aptitude, and have contracted the engagement to remain ten years in public tuition.

The entrance examination consists of an essay on a question selected from the syllabus of infant schools, an essay on a question of methods applied to the education of infants, interrogations, reading with explanation, corrections of pupil teachers' exercises, lectures given in an infant school.

The course lasts one year, and is followed by an examination which all students must attend. The course of studies includes : 1st, lectures on psychology and ethics applied to education, and the history and examination of educational systems relating to infants or young children ; 2nd subjects taught in the normal courses of maternal schools ; 3rd, lectures and practical exercises in the school itself, as well as in the maternal schools and infant schools ; 4th, notions on the legislation and administration of maternal schools and infant schools. (Decree of July 27, 1882.)

3rd, Special Training College of Manual Work.—This college, founded in Paris, in the Rue Louis Thuillier, is intended to train masters, for giving workshop instruction in training colleges and higher primary schools. (Decree of Jan. 1, 1884.)

The course of instruction consists of the putting into practice of the various sciences studied at the training college, or at the higher primary school, or at the professional school : 1st, geometry, mechanics, physics, chemistry, natural history ; 2nd, geometrical drawing, modelling, moulding, sculpture on wood and soft stone, working on wood on the bench, on metals at the forge, in the wax and stereotomy ; 3rd, various exercises, military marches and movements, topographic exercises, fire engine drill, singing, gymnastics.

There is an entrance examination, to which are admitted all candidates who are not less than 21 years, not more than 35 years old, and are provided with the higher certificate of capacity for primary instruction, or of the degree of Bachelor of Science. The examination includes geometrical drawing, ornamental drawing, an essay on a question of physical science, an essay on a question of natural history, interrogations at the black board on any of the scientific subjects of the syllabus of training colleges of primary instruction. Candidates may be (at their own request) examined in writing, in descriptive geometry, trigonometry, and algebra ; or (*viva voce*) in science subjects not included in the syllabus.

The course lasts one year, at the end of which the students may come forward to be examined for the certificate of aptitude for workshop instruction.

This examination is open to the students of the college in the Rue Louis Thuillier, and to all candidates who are no less than 20 years old, and are provided with the higher certificate of primary instruction, or of the degree of Bachelor of Arts, or Bachelor of Science, or Bachelor of the *Enseignement Secondaire Spécial*. (Minute of July 20, 1883). There is a preliminary and a final examination.

The preliminary includes (for male candidates), 1st, a composition in geometry ; 2nd, geometrical drawing : sketch (with size of parts) of an object in relief, and neat copy of same, on a specified scale ; 3rd, a drawing relating to descriptive geometry ; 4th, ornamental drawing from a cast, and modelling from simple model.

(*For female candidates*) : 1st, an essay on hygiene or domestic economy ; 2nd, a lecture on common things, delivered to pupils of a primary or maternal school, after an hour's preparation in a closed room ; 3rd, ornamental drawing applied to women's work.

The Final Examination (men) includes: 1st, a manipulation of physics or chemistry or of Natural History, at the option of the candidate; 2nd, the execution of a piece of work in iron or wood, according to a sketch with size of parts given; 3rd, the examination of work done by pupils (drawings, work done in the workshop); 4th, *viva voce* interrogations bearing on the materials put at the disposal of the candidate. *

(Women): 1st, a very simple manipulation of physics or chemistry or preparation of Natural History, at the option of the candidate; 2nd, household work or needle-work (sewing, knitting, crochet, embroidery, cutting and sewing of clothes). Candidates may, at their own request, be examined in: 1st, calligraphy or handwriting; 2nd, freehand drawing from a bust or relief; 3rd, gymnastics, fencing and military exercises; 4th, topography, land-surveying, levelling, and gauging of streams; 5th, agriculture and horticulture; 6th, execution of manual work in a trade, the choice of which is left to the candidate.

Instruction in agriculture, rendered compulsory by the law of the 16th June, 1879, is entrusted to the departmental professors nominated after a competitive examination by a decree jointly agreed upon by the two Ministers of Agriculture and Public Instruction. A very complete programme, containing the most precise directions on the progress and the divisions of a course of agriculture, has been prepared by the Ministry in execution of the 15th article of the Decree of June 9th, 1880. The teacher, says the report, must inspire a taste for the country in the minds of children by interesting them in natural phenomena, and by introducing them to a knowledge of the life of plants and animals, by developing in them those natural tendencies which would lead them to take an interest in flowers, birds, insects, &c. The lessons on agriculture will also necessarily embrace visits to be made by the pupils under the direction of their teachers to those farms in the district which are best conducted, and also practical exercises, which will follow the lessons given in theory.†

* For technical and elementary artistic education in France, see the First and Second Report of H. M. Commissioners on Technical Education, 1882. A pamphlet; 1884. 2 vols.

† For Agricultural education in France, see M. Jenkins's Report in the Second Report of the Royal Commissioners on Technical Instruction, vol. II. (Spottiswoode, 1884), p. 97, *sqq.*; also Official Explanation of the Laws relating to the Organisation and Management of Farm Schools in France, *ibid.* p. 336, *sqq.*; Law relative to the Departmental Professors of Agriculture in France, *ibid.* p. 339; Decree relative to the Departmental Professors of Agriculture in France, *ibid.* p. 340; Letter of Instruction to the Departmental Professors of Agriculture in France, *ibid.* p. 343; General Scheme for a course of Lectures on Agriculture and Horticulture in French Normal Schools for Teachers, p. 346. See also Appendices XI. and XII. in Mr. Jenkins's report; Programme of the Elementary Instruction in Agriculture of boys in the Rouen district; ditto for girls. For the Evening Schools available for artizans, see Report, p. 29. On the Conservatoire National des Arts et Métiers; Public Free Lectures in France, see p. 31; Evening Instruction in the Provinces, *ibid.*; Evening Classes under Industrial Society of Reims, p. 32; Evening Classes in Lyons, *ibid.*; Evening Commercial Instruction in Paris, p. 33; Evening Art Classes in France, p. 34; École Nationale des Arts Décoratifs, Paris, *ibid.* p. 33; Municipal Art School, Paris, p. 35; Municipal Art Classes, *ibid.*; École des Beaux Arts of Lyons and Toulouse, *ibid.* p. 36-37; École Nationale d'Art Décoratif of Limoges, *ibid.* p. 38; Apprenticeship Schools of Boulevard de la Villette, Paris, *ibid.* p. 49, and 1st Report of 1882, p. 17-20; Le Havre Apprenticeship School, Report 1884, p. 49, and 1st Report 1882; The Watchmaker's School of Paris, Faubourg du Temple, report, 1884, p. 49. See also Higher Elementary Technical Schools in France, Report, *ibid.* p. 70; École de la Martinière at Lyons, p. 70, for girls, p. 74; École Professionnelle Municipale de Reims, p. 75; Primaire Supérieure d'Amiens, p. 80.

GROUP IV.—THE SCHOOL.

Exhibition of Plans, Diagrams, and Books bearing on School Architecture, School Hygiene and Physical Training organised under the auspices of the French Education Department.

CLASS XXXIV.

(West Central Galleries).

Designs and Models of Improved Buildings for Elementary Schools, Infant Schools, and Crèches, &c.

EDUCATION AND FINE ARTS DEPARTMENT. (Ministère de l'Instruction Publique et des Beaux-Arts. Committee on School Buildings.)—(1) Specimen of Schools built since 1880. 6 plans. (A) Types of Infant Schools. (B) Types of mixed Schools in rural districts. (C) Schools with a single class-room. (D) Schools with two class-rooms. (E) Schools with three or four classes. (F) Higher Primary and Technical School, course of instruction comprising three years. (2) Regulations. Minute du 17 Juin, 1880, as to the construction and fitting up of schools. Special circular of 28 July, 1882, for the construction of elementary schools, adopted by the School Building Committee. (I.) General Conditions. II. Caretaker's apartments. III. Cupboards, passages, staircases. IV. Class Rooms. V. Drawing Class Room; Workshop. VI. Covered shed and appurtenances for gymnasium. VII. Playground, Garden. VIII. Privies, Urinals, Cesspools. IX. Apartments for Master and his assistants. Résumé of instructions relative to the building of schools. Special circular of 28th July, 1882, as to the construction of infant schools. (3) Selection of Plans, and Details of Plans, and Photographs of school buildings private and public, 1 screen and 1 portfolio.

EDUCATION AND FINE ARTS DEPARTMENT (FINE ARTS SECTION).—(1) Plans of the National School of Industrial Arts at Roubaix; Architect, M. Dutert. (II.) Plans of the National School of Decorative Arts at Limoges (Haute-Vienne); Architect, M. Jourdain. This school was established by the Municipality for Instruction in Art bearing on the ceramic manufactures for which Limoges has long been famous, and has been recently placed upon an entirely new footing by the decree dated November 5, 1881. It will henceforth be called L'École Nationale des Arts décoratifs de Limoges. M. Louvrier de Lajolais, the Director of the École Nationale des Arts décoratifs is also the director of this school.

1. VILLE DE PARIS.—(Plans of the Training College of Auteuil: the Higher primary school Arago; the boy's primary school, Avenue Duquesne; infant school Rue Jourdain; elementary school for boys and girls, Rue Blanche; and temporary schools erected to insure the execution of the new law making attendance at school compulsory. See Catalogue de l'Exposition spéciale de la Ville de Paris.)

2. SOCIÉTÉ DES CRÈCHES (Président, M. MARBEAU, 27 Rue de Londres, Paris.)—Reduced Model of a crèche (one tenth of its real size). 2 Plans of Crèches. Photograph of the Crèche des Ternes, Paris. Publications relative to Crèches by F. Marbeau. "Bulletin des Crèches," 1876-1884. See also Classes 40 and 55.

3. SOCIÉTÉ DES ÉCOLES ENFANTINES. Association for the propagation of New Methods of Teaching in Primary and Infant Schools. Secretariat, 175 Rue St. Honoré, Paris.—(1) Plan of a Model Infant School for 50 children. (2) Plan of a Model Infant School for 100 children. (3) Model of an Infant School. See Cl. 47 in *The Central Technical Institute (French Section of Education), 1st Floor.*

4. INSPECTION DÉPARTEMENTALE DU NORD. (M. BRUNEL, Inspecteur, Directeur de l'Enseignement Primaire du Nord, at Lille.)—Several Plans of Elementary Schools of the Département du Nord. (See also Classes 48, 49, 50). (1) Commune of Mons-en-Barœul. Two plans of boys' school with teacher's apartments and town hall. M. A. Mahieu, architect. (2) Town of Roubaix. 6 plans of the Institut Turgot, public higher primary and technical school for boys. (M. Richez, architect.)

5. INSPECTION DÉPARTEMENTALE DU PAS-DE-CALAIS.—Plans of Schools. (1) School for Boys, of Marck (Département du Pas-de-Calais). (2) School for Boys, of Mametz (Département du Pas-de-Calais). (3) School for Boys, of St. Martin-au-Laert.

6. DÉPARTEMENT DE LA GIRONDE.—(1) Plans of the Training College (Ecole Normale d'Institutrices) of Gironde. M. Valloton, architect. (2) Plans of School-houses of five rural districts of the Département of Gironde.

7. VILLE DE BORDEAUX.—Plans of several Schools of the town of Bordeaux.

8. DÉPARTEMENT DU LOT ET GARONNE.—Five Plans of Elementary Schools of the Département du Lot et Garonne.

9. VILLE DE FLERS (DÉPARTEMENT DE L'ORNE).—Copies of School Plans; architect, M. Hédin. (1) Elementary School, with 8 class-rooms (boys). (2) Groupe scolaire of Flers (primary school for girls, with infant school).

10. VILLE DE ROUEN (Mayor, M. RICARD).—Plans of Schools. Architect, M. Jules Touzet. (1) Higher Primary and Professional School for 320 pupils (7 plans). (2) Private School for Girls (école libre de filles). (3) Infant School (école maternelle). (4) School for Girls with Infant School (école enfantine).

11. M. MACHUEL, Inspecteur d'Académie in residence at Tunis.—(1) Plan of the Tunis primary school for boys. (2) Views of the school.—Photographs of school children. (See also Class 48.)

12. CERNESSON, LÉOPOLD CAMILLE, Architect, late President of the Municipal Council of Paris, 23 rue Michel-Ange, Paris.—Plan of the Higher Primary School of Montbard. (See also Class 52.)

13. BOUVARD, J., Architect of the City of Paris, 55 rue de Verneuil, Paris.—Plans of the National higher primary school of Voiron (Isère). (1) General plan—ground floor—First floor, front. (2) Ground floor of the primary and infant schools. (3) First floor of the same. (4) Higher primary school, elevations, plan of ground floor. (5) First floor of the same school. (6) Outside buildings, kitchens, refectories.*

14. CITY OF HAVRE; Mayor, M. Sigefried; Chief Architect, M. L. David.—(1) Detailed Plans of the Technical School (École d'Apprentissage) of Hâvre. (2) Photographs of the École des Beaux-arts of Hâvre. (3) Type of an isolated school desk and seat as used in the Hâvre municipal schools. (See also Class 57. Central Technical Institute.)

15. M. LIVET, 4 rue Ste. Marie, Nantes (Loire-Inférieure).—(1) Plan of the Institute Livet, founded 1846, Technical and Apprenticeship School. (2) Plans of Workshops for the scholars; documents, &c. (See Class 53 in Central Technical Institute, 1st Floor, Room No. 48.)

16. DÉPARTEMENT DU CALVADOS.—Plans of the Training College for male teachers (École Normale d'Institutrices) of Caen. Architect M. A. Nicolas.

17. DÉPARTEMENT DES BASSES ALPES.—Drawings and Plans of the Training College for female teachers at Digne (Bas es-Alpes). Architect M.

17a. DÉPARTEMENT DE L'AISNE, Training College of Laon.—Three plans.

18. DÉPARTEMENT DU LOIR ET CHER.—Plans of the schools of Bourgeau, near Romorantin and of the hamlet school of Berveuse, near Maray. Architect, M. Chauvallon. (See Ministère de l'Inst. Publ. 2. Portfolio.)

19. DÉPARTEMENT DES DEUX-SÈVRES.—3 Plans. Types of hamlet schools.

20. MASSON (Architect), AVENUE PARMENTIER, PARIS.—Project for a group of school buildings for the Commune of Bondy, Seine.

21. SOCIÉTÉ NOUVELLE DE CONSTRUCTION (SYSTÈME TOLLET), 61 Rue Caumartin, Paris.—Designs and Plans for schools on this system. (See also Group IIIa.)

22. SOCIÉTÉ DES ATELIERS DE NEUILLY (O. ANDRÉ, Directeur), Rue Charles Lafitte, Neuilly-sur-Seine.—Scholastic Furniture and Plan of a Portable School (See also Group III.)

23. FONDATION BISCHOFFSHEIM Professional School for Girls of the Jewish persuasion, 13 Boulevard Bourdon, Paris.—Plans of the School. (See Class 49 in the Central Technical College, 1st Floor, Room No. 9.)

* This establishment, in course of construction, will accommodate 750 children, viz.: 200 in the infant schools, 250 in the primary, and 300 in the higher primary school, out of which 160 will be boarders and 40 half-boarders. Special halls are destined for the teaching of gymnastics, drawing, casting, modelling, workshop work, &c. There will be also gardens for experimental work. Anticipated expenses for the construction 1,555,000 fr., out of which the State will contribute more than 1,000,000 fr.

CLASS XXXV.

(West Central Gallery.)

Apparatus and Fittings for warming, ventilating, and Lighting Schools, School Latrines, Closets, &c.

FRENCH EDUCATION DEPARTMENT.—(1) Specimens of appliances and apparatus for the Lighting, Warming, Ventilating of primary schools. (*See Specimens of Schools erected since 1880, Cl. 34, and also Documents, Cl. 40.*) (2) Specimens of fittings and arrangements for the Lighting, Warming, Ventilating of secondary grade schools (Lycées et Collèges). (*See plans of new Lycées et Collèges by de Beaudot, Lecœur, Vaudremer, Proust.*)

24. TRELAT, ÉMILE, Director of the Special School for Architecture, Boulevard Mont Parnasse, Paris.—School lighting (Éclairage scolaire). Two plans, showing how class-rooms ought to be illuminated, heated, ventilated, &c., so as to avoid the injurious effects of direct sunlight and heated air.

25. DE BEAUDOT, Architect, 3 Place de Rennes, Paris.—Plans of the Lycée Lakanal à Sceaux, near Paris (Seine). 7 Panels. This lycée (National School for secondary instruction, constructed for 700 boarders, 50 day boarders, and 100 day scholars) is constructed on a space of 9 hectares. The buildings are surrounded by a park; the disposition of the buildings is such that the play courts are sheltered against the west and north winds; they are open to the east, and look on to the park. The refectories or dining-halls are near the kitchens, which are isolated from the rest of the buildings. The establishment is warmed by steam. “The system of warming is combined with that of the ventilation necessary in the class-rooms, studies, and dormitories. For this purpose vertical openings are placed in the wall and united with the horizontal shafts placed at the bottom of the rafters, and placed in communication with the ventilating lanterns on the roofs.” (Note by the Architect.) The Sanatorium is turned towards the east in a completely isolated building. A special building for contagious diseases is connected with it by an open gallery. The school gymnasium and covered courts (préaux) face the park. Great care has been given to the hygienic arrangement of the lavatories and closets. They are supplied with a great abundance of water and by means of réservoirs de chasse and other dispositions marked on the plans the diluted matters are speedily carried away through a special drain which reaches the river Bièvre at the point where it meets the main drain (égoût collecteur) of the left bank of the Seine.

26. LECŒUR, Architect, 128 Rue de Grenelle, Paris.—(1) Type of a Secondary School in a country town. Plans of the Lycée of Bayonne. Bird's-eye view of the buildings, courts, and gardens. (2) Types of Secondary School in the most populated part of the metropolis. (A) Plans of the Petit Lycée Condorcet, corner of the Rues d'Amsterdam and de Hambourg at Paris. This lycée, an annex to the largest Paris public school (Lycée Condorcet), situated between the place du Havre and the Rue Caumartin, is specially devoted to the junior boys. Number of scholars 766, of which 230 are day boarders and 536 day scholars (externes). Terms for the year: Grammar division, day boarders, 850 francs; day scholars, 250 francs. Lower division, day boarders 700 francs; day scholars, 180 francs. Warming, by steam at low pressure (system Geneste and Herscher). Methodical circulation of steam, heating surfaces direct into the room, the said surfaces placed at the foot of the cold air chamber, emission of pure air moderately hot, evacuation of foul air by opening into the collecting shafts. Direct ventilation all through the year. (B) Plans of the Petit Lycée Louis-le-Grand, in course of erection opposite to the Jardin du Luxembourg, Paris, inaugurated in October, 1883. (C) Lycée de Montluçon (Allier), area 20,000 square metres. The play grounds are open to the south. Underground drains carry all pluvial and other waters to the Cher. Special Taps placed in the drains facilitate their frequent cleansing. Warming by ceramic calorifères with heated air, system Geneste et Herscher. Actual number of pupils 309; boarders 98. (D) Project of a Normal School with detached boarding houses, Tutorial system.

27. VAUDREMER, Architect, 110 Rue de Grenelle, Paris.—(1) Plans of the Lycée at Ajaccio (Corse). (2) Plans of the Lycée de l'Avenue Duquesne à Paris. (3) Plans of the Lycée de Grenoble (Isère).

28. PROUST, Architect, Paris.—Photographs and Plans of the Collège Communal at Fontainebleau.—(1) Front Elevation (Photograph). (2) Ground Floor. (3) First Floor.

29. MARCEL, LAMBERT, Architect, 8 Rue du Havre, Paris.—Plans of a Collège d'Enseignement Secondaire Spécial, for day scholars only.

30. GENESTE ET HERSCHER, Engineers, 42 Rue du Chemin-Vert, Paris.—(1) Models and Plans. (2) Album of Plans and Drawings of Apparatus and Appliances for warming and ventilating of schools and various public establishments of education. (*See also maps I., III., V.*)

For Classes xxxv., xxxvi., and xxxvii. See also Ville de Paris, special catalogue.

31. **ESPERON-MORIN**, fumiste, Rue du Pont, à Issoire (Puy-de-Dôme). Specimen of a Ventilating Calorifère (Stove) for class-rooms and public establishments of instruction. This stove has been constructed in conformity with the rules issued by the French Education Department. The pure air passes into a double enclosure, whence it acquires a high temperature, then it escapes by the upper portion of the apparatus, after having been saturated with steam. Price of the model No. 3 for warming 300 cubic meters, 180 francs.

32. **GUÉRIN**, 34 Rue Laugier, Paris.—Models of hygienic parquets and moveable floors for schools. (*See also Group III.*)

33. **MONTHIERS**, Civil Engineer à La Croix en Brie (Seine-et-Marne).—Wood plinths and appliances for heating and ventilating schools. (*See also Group III.*)

CLASS XXXVIII.

(*West Central Gallery.*)

Precaution in Schools for preventing the spread of Infectious Diseases, School Sanitoria, Infirmaries, &c.

34. **DR. GIBERT**, 4 Rue Séry, Le Havre (Seine-Inférieure).—Model of a Dispensary for Children.

35. **M. CHAIX**, Printer and Publisher, 20 rue Bergère, Paris.—Plans of a professional school annexed to the printing establishment of M. Chaix.—Hygienic arrangements for protecting and improving the health of the apprentices and scholars of the preparatory school. See notice by the apprentices of M. Chaix's School, printed in French and English. The Technical School, founded in 1862, by M. Napoléon Chaix, comprises three distinct groups : 1. The apprentice compositors ; 2. The apprentice engravers and lithographers ; 3. The boys and youths occupied at the machines. Every apprentice receives per day, a gratuity varying from 50 centimes to 3 fr. 50 c. according to age. The direction of work is entrusted to three chief foremen, the school teaching is given by 13 of the principal people connected with the firm. Apprentices have the free use of an extensive library. Means of encouragement and emulation : 1. Counters (*jetons de présence*) of the value of 10 centimes (one penny) are given every day to the pupils whose behaviour and work during the lesson have been satisfactory. The sum represented by the counters which have been given out since the origin of the courses amounts to 9900 francs ; 2. List of honour ; 3. Annual distribution of prizes ; 4. Frequent gifts of instructive and moral books. Among the measures taken for the health of the boys, there is one which we would specially call attention to : it is the monthly hygienic inspection. On the first Monday of the month the apprentices meet to be examined by the doctor of the firm, who examines their general state of health, and orders, for those that need them, tonic and strengthening medicines. More than one hundred flasks of cod-liver-oil, syrup of gentian, antiscorbutic syrup and quinine wine, are every year supplied to the boys. Bath-tickets are also delivered to those that ask for them ; the distribution amounts, on the average, to twenty tickets per month in winter, and to thirty-five in summer. The monthly hygienic inspection which gives an opportunity to the doctor for renewing his useful counsels about hygiene and cleanliness, was instituted in 1873 ; it has produced excellent results, and a sensible improvement is reported in the health of the boys.

CLASS XXXIX.

(*West Central Gallery.*)

Special Apparatus for Physical Training in Schools, Gymnasia, Apparatus for Exercise, Drill, &c.

FRENCH EDUCATION DEPARTMENT (*Ministère de l'Instruction publique et des Beaux-Arts.*)—(1) Law of January 27, 1880, declaring the teaching of gymnastics obligatory in the establishments of public instruction. (2) Specimen of apparatus and gymnastic appliances conceded to the Training Colleges and primary schools by the French Education Department. The appliances are provided by Messrs. Fréte and Co., Corderie Centrale, 12 Boulevard Sébastopol, Paris. (3) Photographs of school gymnasia and groups of children learning drill and gymnastics. (4) Handbooks for teaching gymnastics and drill.

VILLE DE PARIS, Plans of the Gymnase Voltaire, Rue Japy.—This building, begun in 1883, will soon be opened. It comprises a basement, ground-floor, and offices on the first floor. The basement is occupied by two cellars and two heating appliances. On the ground-floor is the cloak-room, the inspector's office, an assembly hall, water-closets for both sexes, two magazines or dépôts for gymnastic apparatus, a room for the hot-water baths, a space reserved for gymnastic exercises, and a stall for distributing prizes to pupils in communal schools. Four steps conduct to the first floor. The total area is 1654 mètres. The cost amounts to 200,000 francs, to which must be added 380,000 francs for the ground and 300,000 francs for building.—(*Extract from the Catalogue de l'Exposition Spéciale de la Ville de Paris.*)

36. REIBER (ÉMILE) Architect, 54 Rue Vavin, Paris.—Decorative panel, "La Géométrie en action," gymnastic bars and hoops.

37. N. LAISNÉ, Inspecteur de l'enseignement de la Gymnastique dans les Écoles Communales de la Ville de Paris, 264 Rue St. Jacques, Paris.—Works on physical education. (See class 40.)

37a. GOUPIL ET CIE.; BOUSSOD ET CIE. SUCCESSORS, 9 Rue Chaptal, Paris.—*La Jeune Garde*, photo-gravure of a picture by E. Frère.

37b. MESSRS. FRÉTÉ ET CIE., Corderie Centrale, 12 Boulevard Sébastopol, Paris, Fournisseurs du Ministère de l'Instruction Publique.—(1) Specimens of appliances for teaching gymnastics in schools of primary and secondary grade. (2) Games connected with the teaching of gymnastics. (3) Appliances for teaching fencing, masks, gloves, foils, plastrons, &c., as supplied to several national and municipal lycées and collèges. (See also East Central Gallery.)

38. NICOLAS, FRANCISQUE, 50 Rue Claude Villefaux, Paris.—(1) Apparatus for teaching fencing and gymnastics in schools. (2) Rifles for schools (Fusil Scolaire). (See No. 1303, East Central Gallery 4.)

39. CERCLE PARISIEN DE LA LIGUE DE L'ENSEIGNEMENT, (Président, M. EMMANUEL VAUCHEZ, 175 Rue St. Honoré, Paris).—Specimen of gymnastic apparatus and rifle with which many schools have been provided at the expense of the Ligue de l'Enseignement. (See also Class 55 in the Central Technical Institution, Room No. 8.)

40. UNION FRANÇAISE DE LA JEUNESSE, 157 Boulevard St. Germain, Paris.—Album of photographs relative to the teaching of gymnastics in schools.

41. COLLÉGÉ SAINTE-BARBE, Place du Panthéon, Paris (Director, M. DUBIEF).—Photographs and Plans of the School, Class-rooms and Gymnasium, &c.

42. ÉCOLE MONGE, 145 Boulevard Malesherbes, Paris, (Director, M. GODAERT).—Photographs of the school, class-rooms, play-yards, gymnasium, dormitories refectories, etc. Groups of pupils and documents.

43. ÉCOLE ALSACIENNE, 128 Rue d'Assas, Paris (Head-master, M. RIEDER, Agrégé de l'Université).—(1) Plan of the Gymnasium. (2) Plan of the School. (3) Documents relative to the School. (4) Album of Photographs.

44. SOCIÉTÉ PATERNELLE ET COLONIE AGRICOLE DE METTRAY, near Tours, Indre et Loire.—Album of the School, Plans, Photographs of groups of Inmates in the Class-room, at field-work, in the gymnasium, at drill, etc.

45. GARCET ET NISIUS, 78 Rue de Rennes, Paris.—Special Apparatus for Gymnasium and Military exercises. (See No. 1303, East Central Gallery 4.)

46. PETIT, ET DUMOUTIER, 71 Rue Charlot, Paris.—Special Apparatus for teaching swimming in Schools. (A reduced model.)

CLASS XL.

(West Central Gallery.)

Literature, Statistics, Diagrams, &c., relating to Group 4.

FRENCH EDUCATION DEPARTMENT (Ministère de l'Instruction publique et des Beaux-Arts).—Regulations relative to the Construction of Schools. Various documents, bearing on school buildings and school furniture. Collection of Documents relating to (a) The Hygienic Arrangements in Schools, (b) the Medical Inspections, (c) Physical Training of Children in and out of School. (See also Class 55, Central Technical College, Room 9; 1st Floor.) DOULIOT (Caravanes scolaires); POULAIN, *L'éducation physique*, (essay on) and H. Sabatier-Plantier, Société pour la propagation des Fêtes d'enfants.

VILLE DE PARIS.—Plans and Models of Schools. (See Catalogue Spécial de la Ville de Paris.)

47. CERCLE DE LA LIBRAIRIE, de l'imprimerie, et de la papeterie, 117 Boulevard St. Germain, Paris (M. PLON, President).—Collective Exhibition: Books, Plans, Diagrams on School Architecture; School Hygiene and Physical Training of Children. (See Class 55, the lists of the adherents to the collectivity. The principal exhibits are in the Technical Institute 1st Floor, Room 9.)

48. *Des Fosse & Cie.* (ancienne maison Morel), Rue Bonaparte, Paris.—Designs and Plans of School Architecture. (1) *Architecture Communale*, a portfolio of eighteen plates (of plans, sections, and elevations of schools). (2) *Encyclopédie d'Architecture*, a portfolio of forty-two plates relating to lycées, schools, &c. (3) *Architecture Scolaire*, a portfolio of seventy-two plates and explanatory text (hamlet schools, boys' schools, girls' schools, scholar groups, infant schools, technical schools, training colleges of primary instruction). (4) Paris: Monuments erected by the city from 1850 to 1880. An extract showing the buildings devoted to public instruction.

49. *Ducher et Cie.* Publishers, 51 Rue des Ecoles, Paris.—Works on School Architecture. (1) Infant and other Schools. (2) Designs for same, awarded a prize at the Trocadéro Exhibition. (3) Various Plans and Drawings of School Architecture.

50. **NARJOUX, FÉLIX**, Architect, 8 rue Littré, Paris.—Works on School Architecture. (1) *Ecoles publiques en France et en Angleterre*, 1 vol. 8°. (2) *Ecole publiques en Belgique et en Hollande*, 1 vol. 8°. (3) *Ecole publiques en Suisse*, 1 vol. 8°. (4) *Ecole normales primaires en Europe*, 1 vol. 8°. (5) *Ecole normales et Salles d'Asile*, 1 vol. 18°. (6) *Construction et installation des écoles primaires*, 1 vol. 8°. (7) *Réglement pour la construction et l'ameublement des maisons d'école*, 8°. (8) *Ecole publiques en Europe*, 1 vol. 18°. (9) *Architecture scolaire écoles de hameaux*, 1 vol. 4°. (10) Paris, édifices consacrés à l'instruction publique, 1 vol. fol.

51. **SOCIÉTÉ PROTECTRICE DE L'ENFANCE**, 4 Rue des Beaux-Arts. Director, Dr. Marjolin. Documents and notice on the works of this society; statistics.

52. **MATERNAL CHARITY SOCIETY**, 3 Rue Méchin, Paris.—Secretaries: Mme. Raibert and M. F. Gille. Notes and documents on the Society.

53. **DR. LAYET**, Professeur d'Hygiène à la Faculté de Médecine, 42 Rue du Palais de Justice, Bordeaux.—Report for the inspection of Communal Schools at Bordeaux.

54. **Dr. C. DELVAILLE**, ancien adjoint au Maire de Bayonne.—Documents on School Hygiene—(1) *Réglement et organisation de la Commission Municipale d'Hygiène et de Statistique de Bayonne*. (2) *Feuilles mensuelles constatant l'Etat Hygiénique de chaque classe*. (3) *Rapport des Travaux de la Commission d'Hygiène pour 1883*, par le Dr. Delvaille. (4) *L'Inspection médicale des Ecoles*, par le Dr. Delvaille.

55. **Dr. A. RIANT**, Chief Physician of the *École Normale de la Seine*.—Works on Hygiene—(1) *L'Hygiène et l'Education dans les internats, lycées, colléges, pensions, et maisons d'éducation*. Paris: *Hachette*. (2) *L'Hygiène Scolaire*. (3) *Leçons d'Hygiène*.

56. **DR. ELIE PÉCAUT**.—*Hygiène Scolaire*. 1 vol. *Hachette et Cie*, Paris.

57. **N. LAISNÉ**, Inspecteur de l'Enseignement de la Gymnastique dans les Ecoles Communales de Paris, 264 Rue St. Jacques, Paris.—Works on Physical Education.

58. **ÉCOLE SPÉCIALE D'ARCHITECTURE**, Boulevard Montparnasse, Paris. **ÉMILE TRELAT**, Director.—(1) *Album of Models of constructions for hospitals*. (2) *Programme of a series of Lectures on Hygiene delivered at the École Spéciale d'Architecture*.

59. **BOURDEILLETTÉ (Architect)**, Rue Bourdille, Périgueux.—*Memoir on School Architecture (MSS.)*

CENTRAL INSTITUTION OF THE CITY AND GUILDS OF LONDON.

(Rooms 7, 8, 9 and Corridor.)

DIVISION II.—EDUCATION.

CLASS XLVII.

Crèches and Infant Schools.—(a) Apparatus and Fittings for Crèches and Infant Schools; (b) Games, Toys, and Kindergarten Amusements; (c) Models and Appliances for Teaching; (d) Examples of School Work.

MINISTRY OF PUBLIC INSTRUCTION AND FINE ARTS, Paris.—
(1) Regulations for the organization of normal training for governesses in maternal schools.
(2) Documents relative to the organization of maternal schools. Decree of Aug. 2, 1881; and minute of July 28, 1882. Plaqs. (See also Classes 35 & 55.)

1. **CERCLE DE LA LIBRAIRIE.**—(1) Collective Exhibit of Books, &c. (2) Samples of Didactic Appliances for Maternal Schools. (See Class 48 for List of Members.)

2. **INFANTS' SCHOOLS SOCIETY.**—(*Société des Écoles Enfantine*, founded 1871, formerly called *Société Froebel*; association for the propagation of the new methods of training in infant schools; Offices—175, Rue St. Honoré, Paris). Plans, model of infant school, specimens of the occupations and amusements of children in the *Écoles Enfantine*.

3. **MONTERNAULT, MADAME A.**—French Intuitive Method. (Hachette.)

4. **BELLIER, Mme., 16 Rue Cabirol, Bordeaux.**—‘Le Moniteur du Jeune Age,’ numbers for 4 years.—Prizes for infants' schools: Bonspoints du Jeune Age.

5. **INSPECTION ACADEMIQUE DE LA GIRONDE.**—(1) Specimen of the occupations and works of the children of the infant schools at Bordeaux. (2) Treatise on the site of Infant Schools, par Mme. l'inspectrice des Écoles Maternelles.

5a. **INSPECTION ACADEMIQUE DU DÉPARTEMENT DU NORD.**—Specimens of the work done in the infant schools.

6. **LIETOUT, Mme., 13 Rue de Poissy, Paris.**—(1) Instructive games for children; Compendium for Maternal Schools. (2) Musical Diagram, teaching simultaneously reading, writing, and singing. (3) Disc, showing the formation of compound colours. (4) The education of the senses.

7. **RACT et FALQUET, 16 Rue Cassette, Paris.**—(1) Map of France, for Maternal Schools, by Mlle. Veyrières. (2) Globe for similar Schools. (3) Durand's ‘Législation des Écoles Maternelles.’ (4) ‘L'Ecole Maternelle,’ periodical. (5) Table and bench for infant schools.

8. **GARRET et NISIUS, 76 Rue de Rennes, Paris.**—(1) Froebel's Counter and other objects for Kindergarten. (2) Plan of a Village Infant School. (3) Object Lessons for Infant Schools. A Calendar by Inspector-General Cadet, reproduced from the *Dictionnaire de Pédagogie*. (4) Apparatus for hanging maps. (See also *Gallery of Royal Albert Hall*.)

9. **ANDRÉ, O., 54 bis Avenue de Neuilly, Paris.**—Various Objects of School Furniture, designed specially for minimizing the size of the support of school tables and benches, so as to facilitate the better sweeping and cleaning of school-rooms. Models of school furniture adopted by the Training College of Auteuil, the Schools of St. Denis, the College Ste. Barbe, &c. (See *Western Central Gallery*.)

10. **D'HENRIET, 28 Rue Chabrol, Paris.**—Collection of Easy Models for teaching drawing to young children.

11. **MLLE. LAURE COLLIN.**—Manuel d'enseignement de la méthode chorale enfantine for infant schools.

For the Ville de Paris Schools, scholastic furniture and pupil's work, see *Western Central Gallery and Special Catalogue*.

CLASS XLVIII.

Primary Schools.—(a) Apparatus and Fittings; (b) Models and Appliances for Teaching, Text-books, Diagrams and Examples; (c) Specimens of Work in Elementary Schools.

MINISTRY OF PUBLIC INSTRUCTION, Paris.—(1) Samples of the Collection of Books granted by the Department to Communes for the formation of Libraries of general

information in the elementary schools. (2) Papers relating to the same. (3) Specimens of school appliances (maps, diagrams, &c.) supplied by the firms of Hachette et Cie., Ch. Delagrange, Gautier, Ikeimer, Bertaux, Lanée, Challamel, Rothschild, Belin, Boyer, Duru, Masson, &c., and granted gratuitously to the primary schools and training colleges by the Education Department for the teaching of geography and the demonstration of the metrical system:

Hachette et Cie., 79 Boulevard Saint-Germain, Paris. This firm exhibits the following geographical works—Meissas (A. and G.): A new map of France (78·7 inches by 82·6 inches), giving the watercourses, mountains, administrative divisions, railway lines. Meissas: A new map of Europe (78·7 inches by 82·6 inches), similar in all respects to the above. Meissas: A map of the world (43·3 inches by 67 inches), giving only the principal divisions of the world. Cortambert (E.): A small map of France (35·4 inches by 47·4 inches). Cortambert (E.): A small map of Europe (same size), both intended for small schools in rural districts. Vivien de Saint-Martin: A globe of the earth (13 inches diameter). There are some globes of variable size and the prices vary accordingly.—School Museum by Dr. Saffray—School reward cards—(a) botanical, (b) geographical, (c) various trades—Level's *Compendium Métrique*—Material for infant schools.

(*Ch. Delagrange, Rue Soufflot, Paris.*)—Maps, drawn by Prof. Levasseur: (1) France Scolaire (scale $\frac{1}{100,000}$), (2) Europe (scale $\frac{1}{100,000}$) (3) The World (scale $\frac{1}{100,000}$). All these represent the principal physical features, agricultural products, coal mines, metallurgical centres, chief railways, telegraphic and submarine cables, lines of navigation, and leading political and economical facts. A map of Europe (scale $\frac{1}{100,000}$) by Larochette, in chromo-lithography, (1·55 metres by 1·25 metres), remarkable for its clearness of details. A Globe of the Earth, by the same (1·20 metres or about 48 inches in circumference), showing at a glance the seas and rivers and mountains, as well as the lines of navigation and telegraphic and submarine cables.

(*Maison J. Gautier, 55 Quai des Grands Augustins Paris.*)—Wall Maps: map of France, map of Europe, and map of The World, drawn by A. Vuillemin. These maps, while containing all indispensable details, are remarkable for their clearness. The scale which has been adopted has made it possible to give greater importance to the representation of the mountains. A table of the weights and measures, by Henry des Vosges, sums in a convenient form the advantages of the metrical system.

(*Ikeimer, 47, Rue des Francs Bourgeois, Paris.*)—A Map of the World in Hemispheres, measuring 1 metre 85 by 95 centimetres (6·06 feet by 3·11 feet), and giving the results of the most recent discoveries, the great lines of navigation, the chief railways, the submarine cables, the telegraphic lines on land in Asia and Australia, the sea currents, and showing the political divisions, and the colonial possessions of the various states. A Globe of the Earth, one metre (39·37 inches) circumference, prepared by R. Barbot, giving the results of the recent discoveries of Livingstone, Stanley, Cameron, Dr. Nordenkjold, the telegraphic lines and cables, the great lines of navigation, the mountain systems, the sea currents, and showing the French colonial possessions.

(*E. Bertaux, 25, Rue Serpente, Paris.*)—A Globe of the Earth, by E. Dubail. This globe is 14·96 inches in diameter. The author, late professor of geography at the Military College of St. Cyr, has, by a judicious use of various tints, rendered perceptible the difference in level of valleys and table-lands. The globe represents also the sea currents and the great lines of navigation and of communication by land. The details concerning political geography have been reduced to what is strictly necessary, and in no way interfere with a proper understanding of the physical geography.

(*Lanée, 8 Rue de la Paix, Paris.*)—Three Wall-Maps (France, Europe, The World), on which all important details are made conspicuous by a judicious use of a few tints; also a table, giving the weights and measures of the French Metrical System.

(*Challamel aîné, Paris.*)—(1) A Map of the Colony of Senegal, or of the French Possessions on the West Coast of Africa. This Map, drawn by C. Mathieu, includes all the country situated between Lake Tanahie and Sierra Leone. It shows the various independent and protected states, the position of French, English and Portuguese forts, and all administrative divisions. (2) A map of the Province of Oran, by Ad. Langlois (scale $\frac{1}{100,000}$) gives all the places, rivers and thalwegs, altitudes, administrative divisions, roads, railways, telegraphic lines, steamboat lines, lighthouses, cultivated portions, forests, mines, quarries, mineral springs, a plan of the city of Oran, a small map of the neighbourhood of Oran, and is accompanied by interesting statistics.

MINISTRY OF PUBLIC INSTRUCTION, Paris.—(3) Synoptic table showing the detailed organisation of primary studies, their objects, methods, and programmes. (4) Note pour servir à l'étude des programmes: Extracts from the *Instructions et directions pédagogiques*, par M. Gréard, vice-Rector of the Académie de Paris. (5) Specimen of diplomas (*certificats of Primary Studies*, &c.), and of merit awards and medals granted to teachers.

CERCLE DE LA LIBRAIRIE, DE L'IMPRIMERIE ET DE LA PAPETERIE,* 117 Boulevard St. Germain, Paris.—Collective exhibition of educational and

scholastic publications, documents and books on primary, secondary, higher, technical, and artistic education, school administration, and legislation prize-books, school rewards, &c., &c.

* The following firms are members:—

Alcan, Félix (Works on Science and Medicine).
Baillière, J. B., & fils do.
Baschet, L. (Artistic Publications).
Bellin Veuve & fils (Scholastic Publications).
Bonnaise Lebel (Images and Prints).
Cerf (Educational Works).
Charavay frères do.
Classon (Technical Publications).
Collin (Armand) & Cie. (Scholastic Publications).
Delahaye et Lecroix (Medical Publications).
Delagrave (Scholastic Publications).
Lelalain frères do.
Des Fosses & Cie. (Architectural Publications).
Ducher & Cie. do.
Ducrocq (Educational Publications).
Dupont, Paul do.

Firmin, Didot & Cie. (Scholastic and Educational Publications).
Gedage (Scholastic Publications).
Goupil & Cie. (Artistic Publications).
Hachette & Cie. (Scholastic and Educational Publications).
Hennuyer (Educational Works).
Metzel & Cie. (Educational Publications).
Heugel (Musical Publications).
Jouvet & Cie. (Scholastic Publications).
Leduc, Alph. (Music).
Lemoine, Achille (do.).
Masson, Georges (Medical and Scientific Publications).
Pion, Nourrit & Cie. (Educational Publications).
Poussielgue frères do.
Quatin (Artistic Library).
Roret (Collection of Books on Technical Education).
Suzanne (Geographical Material).

(N.B.—A detailed Catalogue of the Publications exhibited by the Cercle de la Librairie will be at the disposal of the Visitors in the Room No. 49, Central Technical Institute.)

PRINCIPAL DIVISIONS OF THE WORKS EXHIBITED BY THE CERCLE DE LA LIBRAIRIE AND PRINCIPAL AUTHORS IN EACH DIVISION.

I. *Reading and Writing*.—Works by Béhagnon, Belèze, Dupont, Flament, F. P. B., Néel, Paper-Carpentier, Regimbeau, Taïclet, Villemerouse, &c.

II. *Readers—Object Lessons*.—Works by Belèze, Paul Bert, Bonnier, Bonant, Bruno, Dupont, Gillet Damitte, Guyau, Maigne, Rocherolles, Saffray, &c.

III. *Moral Instruction and Civicism*.—Works by Audley, Bruno, Lalvi, Liard, Mabilieu, Marion, Raymond, J. Simon.

IV. *French Language and Literature*.—Works by Belèze, Bénard, Brachet, Brouard et Berger, Carré et Moy, Croiset, Lallier et Petit de Julieville, Dezobry, Feugère, F. P. B., Frieh, Larive et Fleury, Leclair et Rouzé, Poitevin, Saint Germain, Subercaze, &c.

V. *History*.—Works by Belèze, Bénard, Bernard, Blanchet, Brouard, de Courval, Dézobry, Duruy, F. P. B., Gillet Damitte, Lavissoe, Martin Henri, Pigeonnau, Figuier, Subercaze, Vincent.

VI. *Geography*.—Works by Bainier, Belèze, Brouard, Chevallier, Cortambert, Drioux, Dubail, Dubon et Lacroix, Foncin, F. P. B., Joanne, Lemonnier et Schrader, Levasseur, Pigeonneau, Reclus, Sanis, Vuillemin, &c.

VII. *Mathematical Sciences*.—Works by Amiot, Auvert, Belèze, Burat, F. P. B. Garbet, Hément, Leyssenne, Maire, Rebrière, Tarnier, Vintéjoux, &c.

VIII. *Physical and Natural Sciences*.—Works by Belèze, Paul Bert, Bonnier, Bouant, Fernet, Gérardin, Grignon, Hément, Langleblet, Poiré, Privat Deschanel et Focillon, Regodt, Saffray, Saucerotte, Séguin, Zeller, &c.

IX. *Agriculture, Horticulture*.—Works by Barral, Barrau-Heuzé, Block Hugot, Saucerotte, Ysabeau, &c.

X. *Modern Languages and Foreign Literatures*.—Works by Chasles, Cottler, Darmesteter, Elwall, Heumann, Leclair, Schmitt, Schwartz, Sevrette, de Suckau.

XI. *Pedagogy; administration relative to Public Instruction*.—Works by Barrau, Brouard, Buisson, Cadet, Defodon, Delon, Girard, Gréard, Horner, Jost, Marion, Matrat, Narjoux, Pape-Carpentier, Paroz, Pichard, Rendu, Roussetot, Salmon, Tubercaze, &c.

XII. *Common Law; Legislation; Political Economy; Domestic Economy*.—Works by Bertillon, Blanqui, Block, Dupin, Gillet Damitte, Hippéau, Joly, Raymond, Wirth, &c.

XIII. *Linear Drawing; Art or Ornamental Drawing; History of Art*.—Works by Allongé, Armbruster, Bargue, Cernesson, Collin, Darchez, Garnier, d'Henriet, Le Béaille, Ménard, Pfnorr, Pillet, Ravaission, Riester, Sauvageot, Tronquoy, Viollet-le-Duc.

XIV. *Music and Singing*.—Works by Arnoud, Baillot, Batiste, Bazin, Bizet, Czerny, Danhauser, Duprez, Garcia, B. Godard, Laek, Lavignac, Leduc, Lemoine, Marmontel, Renaud de Vilbac, Rodolphe, &c.

XV. *Manual Work and Handicraft; Technical Instruction; Architecture*.—Works by Louis Figuier, Narjoux, Scheffer, &c.

XVI. *Educational Works and Prize Books*.—Works by Biart, Charavay, Desbeaux, Dupuis, Giron, Habberton, Jacob, Laboulaye, Macé, Maigne, Menard, Muller, de Parville, Pizzetta, Ratisbonne, Rozan, Simonin, Stahl, Verne, &c.

XVII. *Hygiene and Gymnastics*.—Works by Bouchardat, Cornil, Fonsagrives, Martin, Pape-Carpentier, Parrot Elie, Pécaut, Ramboisson, Riant, Saffray, Vergnies, &c.

XVIII. *Various Publications*.—Works by du Temple, F. P. B., Jacquemin, Narjoux, Sauvageot, Vielhés-le-Duc, &c.

VARIOUS OTHER COLLECTIONS OF EDUCATIONAL WORKS EXHIBITED BY THE CERCLE DE LA LIBRAIRIE.

Bibliothèque des Écoles et des Familles, Bibliothèque des Merveilles, Bibliothèque des petits enfants, Bibliothèque rose (Hachette).—Bibliothèque lilas (Delagrave).—Bibliothèque de l'enseignement des beaux arts (Quantin).—Bibliothèque utile (Alcan).—Bibliothèque d'éducation moderne (Charavay frères).—Bibliothèque des mères de famille (Didot).—Bibliothèque d'éducation et de récréation (Hetzell).—Collection Roret.

Founded in 1847, the Cercle de la Librairie which has obtained the highest awards at the International Exhibitions of Vienna and Philadelphia, unites in one association the members of all the various callings connected with the publishing trade and the diffusion of thought and art. The Cercle is the proprietor of the Bibliographie de la France, a publication founded in 1871, for the registration of the titles of all volumes, pamphlets, engravings, prints, and musical publications edited in the country. Le Syndicat de la propriété littéraire (founded by M. G. Hachette), has also its abode at the Cercle de la Librairie. The successive presidents of the Cercle have been, up to the present time: MM. J. B. Bailliére, président du Comité d'organisation, et A. Firmin Didot, membre de l'Institut; M.M. Pagnerre, Thunot, Langlois J. Delalain, Roulhac, L. Hachette, Bréton, Ch. Laboulaye, G. Masson, J. Basset, G. Hachette, E. Plon.

12. ACADEMIC INSPECTORATE OF GIRONDE (INSPECTION ACADEMIQUE DE LA GIRONDE).—Work done by Students in Training Colleges and by Scholars of the Elementary Schools. —(1) Works of teachers in training at the Normal School of La Sauve. Exercise books, drawings, manual work, &c. (2) Similar works from the rue Picard Bordeaux. (a) Manual work in iron and wood. (b) Notice on the organization of the school workshops. (3) Pupils' works from the infant schools of Bordeaux (see above, Classe 47). (4) Plans of school-house of five rural parishes of the Department of Gironde (see Group 4, cl. 34). (5) Notice on the Boys' Higher Primary School of Bordeaux. (6) Report by Dr. Layet on the Health of Schools at Bordeaux (Bulletin départemental de l'Instruction primaire).

13. ACADEMIC INSPECTORATE (INSPECTION ACADEMIQUE) OF THE DEPARTMENT OF PAS DE CALAIS.—(1) Work done in schools; exercise books from the schools of Contes, Boulogne-sur-Mer, Étaples, Saulty, Auchy-les-Hesdin, Auzi-le-Château, Billy-Berclau, Croisilles, Hermies, Buire-le-Sec, Licques, Samer, Lumbres, Campagne-les-Hesdin, Montreuil, St. Pierre-les-Calais. (2) Plans of the Schools of Marck, Mametz, and St. Martin au Lacy. (See Groupe 4, cl. 34, *Western Central Gallery*.)

14. REGENCY OF TUNIS SCHOOLS INSPECTORATE (M. MACHUEL, Inspector).—Works of Scholars in the French and Arab schools at Tunis.

15. MARANS SCHOOL, Charente Inférieure.—15 Copy Books.

16. INSPECTION ACADEMIQUE DU DEPARTMENT DU NORD, M. BRUNEL, Inspecteur, Director of l'Instruction Primaire du Nord.—(1) Plans of Schools. (2) Copy Books (Primary Schools). (3) Manual Work executed in schools: A. Boys—Ironwork, Woodwork, Modelling, Bookbinding. B. Girls—Needlework and Embroidery. (4) Similar Works from schools of a little higher grade.

A Notice on the Exhibition of the Primary Education of the Département du Nord.—The Département du Nord (area, 2195 square miles; population, 1,603,259 inhabitants) contains 2,185 public or private elementary schools (*écoles primaires*), with a staff of 5,475 masters and mistresses. The public elementary schools number 1670, and their staff consists of 3,697 masters and mistresses. The objects which are exhibited are classified into 4 groups: 1st, intellectual and manual work of the higher primary schools (boys and girls); 2nd, intellectual and manual work of the elementary primary schools (boys and girls); 3rd, plans of schools; 4th, detailed syllabus of the subjects taught in the primary schools of the Département du Nord; "Bulletin Administratif" (a periodical issued by the departmental administration), and "Bulletin Pédagogique" (a special review for primary schoolmasters).

I. Higher primary Schools (Boys).—There are sixteen schools of this description in the said department. All receive boarders and day scholars. To all of them are attached a number of entrance exhibitions. The syllabus includes, as a rule, the following subjects: ethics, the French language, handwriting, history, geography, modern languages, mathematics, book-keeping, experimental physics, chemistry, natural history, drawing, singing, gymnastics, and workshop instruction. Each school has its own syllabus, modified so as to meet the local requirements. The pupils receive instruction in adjusting pieces of apparatus, in carpentry, in turnery, in modelling, in sculpture, and are taught to work on iron, wood, stone, marble, and plastic materials. The advantage is twofold: the pupils learn the use of tools, and discover their natural bent.

Objects exhibited by three of these schools: copy-books containing pupils' exercises, drawings (geometrical and freehand), specimens of work done in the workshops; syllabus of subjects taught in each school.

Higher primary schools (girls). The only school represented at the Exhibition is that situate at Boulevard de la Liberté, Lille. The course of instruction lasts four years. Exhibits: copy-books containing the pupils' exercises (maps, book-keeping, handwriting, drawing, essays); specimens of practical work done by the pupils (cutting and seaming of clothes, sewing, embroidery, painting on silk); syllabus of the subjects taught.

II. *Elementary primary Schools (Boys and Girls).*—Children are received from 6 to 13 years. The education is, like in all other parts of France, gratuitous and compulsory. There are in each school three divisions: elementary, middle, and upper.

Exhibits of these schools: copy-books, in which the pupils write their first exercise, in every branch, at the beginning of the month; class-books, in which the masters or mistresses enter the work set for the following day; universal copy-books containing the pupil's daily exercises; practical work (boys); working on iron, wood; book-binding. (Girls) sewing and needlework.

III. *Plans of Schools.*—Plans of the Montesquieu School, and of the Rue Rivoli School (Lille), by M. Mongy, architect (Lille); of the school at Mons-en-Barœul, by M. Mahieu; of the Institut Turgot (Roubaix), by M. Richiez; of the higher primary school at Fournes, by the pupils of the school. (See above, *Class 34*.)

IV. *Syllabus—Official Bulletin.*—Pedagogical Bulletin.

17. **ACADEMIC INSPECTORATE OF THE CÔTE-D'OR.** (See *Class 56*, *Collective Displays*.)

18. **POULAIN, M., École Primaire Supérieure, Illiers, Eure et Loir.**—Diagram of Specimens of Manual Work. Course of Design, 'L'Éducation physique à l'École primaire.'

19. **MUNICIPALITY OF BAYONNE.**—(1) Specimen of Work done in Schools. (2) Specimens of Orthography and French Composition by children of both sexes.

20. **PREVOST ORPHANAGE, Cempuis, Oise (Director, M. ROBIN).**—Works by Scholars. This Orphanage, originally founded in Paris during the war of 1870-71 by M. F. Buisson, was adopted a short time afterwards by a generous philanthropist, M. J. G. Prévost, who transferred it to Cempuis, and bequeathed his fortune to the Departmental authorities of the Seine for the maintenance of it. (See *special notice on the physical education, anthropometric observations, and course of education in the Orphanage*.) (See also *Class 2*.)

21. **GUIBERT, LOUIS, Rocquencourt near Versailles.**—Works by Scholars of the elementary class.

22. **DAVID, M., Grosrouvre par Nouvant, Meurthe et Moselle.**—Methods of teaching reading, writing, and geography.

23. **VAQUEZ, Adjoint au Maire, 16 Arrondissement, Paris.**—Synoptic Table of the History of France.

24. **COUPIN, M., 30 Rue de Mirail, Bordeaux.**—Works relating to Elementary Education.

25. **COULET, T., Villers la Montagne, Meurthe et Moselle.**—'Carnet de Correspondance,' between schools and families, school drawings, exercises, &c., 1883.

26. **ÉCOLE PRIMAIRE SUPÉRIEURE, Gerardmer, Vosges (M. T. MICHEL, Director).**—Register and Monthly Report on the School.

27. **HÉMÉNAT, FÉLIX, Inspector General of Public Instruction, Nanterre (Hors Concours).**—(1) A collection of 12 drawings by Cicéri (60 centimetres by 40 centimetres), in chromo-lithography, and illustrating the following geographical terms: archipelago, canal, sluice or lock; cape, cliff, railway, viaduct, tunnel, roads, streams and rivers; confluence, hills, streams and rivers, glaciers, strait, gulf, volcano; isthmus; lake, glaciers; harbour; valley, torrent. Delagrave edition. (2) Cosmographic Diagrams designed by Fouché. (3) Elementary Works on the Natural and Mathematical Sciences.

28. **VAST, H., PROFESSOR, 9, Rue de Greffuhle, Paris.**—Blank Maps on slated cloth: France, Europe, Central Europe.

29. **ELEMENTARY SCHOOLS OF THE DÉPARTEMENT DE LA CREUSE.**—(1) Specimens of little toys and other work done by young children. (2) Preliminary training in manual work.

30. **LIETOUT, MADAME, 13, Rue de Poissy, Paris.**—Table of Comparative Measures. (See also *Class 47*.)

31. **D'HENRIET, M., 28, Rue Chabrol, Paris.**—Course of Drawing for Elementary Schools.

32. **SÉGUIN et COURCELLE, St. Denis, Paris.**—Enumerators.—Under the above name, MM. Félix Séguin and Jules Courcelle, schoolmasters at Saint Denis (near Paris), exhibit

two apparatuses, one for teachers, the other for pupils, with a view of assisting in the teaching of numeration, of decimals, addition, subtraction, multiplication, and division, of the metrical system (measures of length, area, volume), and of geometry (lines, surfaces, volumes), and of educating the sense of sight by means of the colours in which the various pieces of the apparatus are painted (viz., violet, indigo, blue, green, yellow, orange, red, white with black stripes, black).

33. SÉGUIN & SAUVAGEOT, Bourges, Cher.—Educational Course, published by Delagrave.

34. REGRAIN, A., Chamblet, near Montluçon, Allier.—Educational Works. (See also Class 56.)

35. PILLET, M., 95 Rue Chevallier, Levallois, Seine.—La Méthode Parlante. A method for teaching reading.

36. PICARD, BERNHEIM & CO., 1 Rue Soufflot, Paris.—Educational Works.

37. KUHFF, M., 19 Boulevard Pereire, Paris.—Scholastic Works.

38. HUSTACHE, MIDLLES., Allevard, Isère.—(1) Manuscript Treatise: "L'Éducation à l'École Primaire."

39. BONNARD, P., 49 Rue de Grenoble, Paris.—New System of writing Music. (1) The *Last Musical thought of Weber*, written according to this new method. (2) Tonality of instruments compared, &c.

40. DEPOIN, J. (President of the French Shorthand Society), 23, Quai de l'Horloge, Paris.—Schools Works executed with the aid of Shorthand.

41. DUPLOYE, E., 28 Quai de l'Horloge, Paris.—Method of teaching Reading and Spelling by shorthand writing. (See also the Gallery, Albert Hall.)

42. LABONNE, M.—Stenography.

43. SHORTHAND SOCIETY (Prevost-Delaunay System); President, M. FONTAINE, Rue du 4 Septembre No. 2, Paris.—(1) Course of Shorthand. (2) Pupils. (3) Works. (4) Papers.

44. ANDRÉ, O. (Société des Ateliers de Neuilly, Paris).—Scholastic Furniture.

46. SUZANNE, M., 5 Rue Malebranche, Paris.—Scholastic Materials, Tableaux ardoisés. (See also Catalogue de l'Exposition Spéciale de la Ville de Paris.)

47. ROY, PAUL.—Tablets for various coloured inks.

49. MALLET, ARMAND, 77 Avenue Bosquet, Paris.—Mallet's Microscopes for Schools.

50. MUNICIPALITY OF HAVRE.—School Desk, single seat. (See Class 34, Western Gallery.)

51. GARCET et NISIUS, 76 Rue de Rennes, Paris.—School Materials and Furniture. (The Furniture is in the Gallery of the Royal Albert Hall.)

52. DUPONT, PAUL, 49 Rue J. J. Rousseau, Paris.—Specimen of a School Library (for elementary schools).

53. DAGUERRE, A. B., 14 Rue Deguerry, Paris.—Appliances and Diagrams for instruction by luminous projections. This apparatus has the following advantages:—1. Utilisation of all sources of light (colza oil, paraffin, lime-light, electric light, &c.). 2. The part for holding the object viewed can receive all sorts of pictures and objects of variable dimensions. 3. Luminous and neat images of large size obtained. 4. Cheapness of the apparatus. Accompanying this apparatus, there are a series of photographic pictures on glass, intended for the same mode of teaching. These pictures are on albumen, and are remarkable for their firmness and transparency. Lastly, a mechanical piece shows the distribution of steam in the engines, as well as the working of the piston and slide-valve.

54. BRUNET, PROFESSOR, Sisteron College, Basses Alpes.—Frames for protecting the edges of school books.

55. BONNET, M., 79 Boulevard Edgar Quinet, Paris.—School Furniture, Graduated Desk for elementary schools.

56. PIERRE PETIT, Photographer, Place Cadet, Paris.—Translucid Window Blinds for Schools: photographic reproductions of masterpieces of art on linen. New process.

CLASS XLIX.

Domestic Economy and other Forms of Technical and Industrial Education for Girls.—(1) Models and Apparatus for the teaching of Cookery, Housework, Washing and Ironing, Needlework and Embroidery, Dressmaking, Artificial Flower-making, Painting on Silk, Pottery, &c.; (2) Specimens of School Work.

MINISTRY OF PUBLIC INSTRUCTION AND THE FINE ARTS.—(1) Regulations. (2) Papers.

VILLE DE PARIS. (See Special Catalogue.)

CERCLE DE LA LIBRAIRIE.—(1) Collective Exhibit. (2) Works on Domestic Economy, Needlework, &c. (See Class 8.)

57. **VILLE DE ROUEN** (Seine Inférieure). *École professionnelle et ménagère.* (Mme. Lessire, Head Mistress).—Specimens of Needlework and other Work by the pupils.

58. **GIRLS' PROFESSIONAL SCHOOL OF MELUN** (Seine-et-Marne). (Mme. Valet, Head Mistress).—(1) Linen. (2) Robes. (3) Hats. (4) Artificial Flowers. (5) Photographs.

59. **GIRLS' PROFESSIONAL SCHOOL OF BLÉNEAU** (Yonne). (Mme. Guillour, Head Mistress).—Works by the Scholars.

60. **SCHEFER, MME.**, 90, Rue d'Assas, Paris. — Treatise on Needlework and cutting-out.

61. **BÉRILLON, EUGÈNE**, Auxerre, *La Bonne Ménagère Agricole.*—Treatise on rural economy, 1 vol.

61a. **MME. GIROUX.**—Manuel d'Examen pour l'Enseignement de la Coupe et de l'Assemblage, &c., 1 vol.

62. **LASSIRE et GODEFROY**, Mmes.—Course of Dress Cutting.

63. **COCHERIS, PAULINE**, Mme., Boulevard St. Marcel, Paris.—(1) *Pédagogie des travaux à l'aiguille.* On Teaching of Sewing, 1 vol. in 12mo. This work is intended for teachers and pupils, and gives demonstrations of all kinds of needlework, accompanied by diagrams which render the explanations more easily understood. Hygienic advice holds an important place in this book. A portion of the work contains a review of the present teaching of sewing, cutting and seaming, in the various parts of Europe, and especially in England. (2) *Tableau synoptique des travaux à l'aiguille.* This table, intended to be hung up in schools, is the indispensable companion of the above work. It gives all instruments used in sewing, &c., and explains the formation of all kinds of stitches.

64. **PREVOST ORPHANAGE**, Compiegne, Oise. — Boys' Winter and Summer Clothing. A specimen of a cradle and other needlework, by the Girls of the Orphanage.

BISCHOFFSHEIM FOUNDATION (Working School for young Jewesses), 18, Boulevard Bourdon, Paris. (M. Maurice Block, Director).—Works by the Scholars. (1) Work done in the school and workshops attached to it:—1 Basket of Flowers; 1 Baby's Crown; 1 Chemise; 1 Shirt reduced model; 4 Exercise Books (Book-Keeping); 2 Exercise Books (Music); 5 Geographical Maps; 1 Ditto (larger size); 5 Exercise Books (English Ed.); 10 School Exercise Books (1st Division); 6 Ditto (2nd Division); 6 Ditto (3rd Division). (2) Plan of the School. Documents on the School.

CLASS LI.*

Science Teaching. (1) Apparatus and Models for Elementary Science Instruction in Schools. Apparatus for Chemistry, Physics, Mechanics, &c.; (2) Diagrams, Copies, Text-books, &c.; (3) Specimens of the School Work in these subjects.

MINISTRY OF PUBLIC INSTRUCTION AND THE FINE ARTS.—(1) Catalogue and Specimens of Objects relating to scientific instruction granted to elementary schools. (2) Catalogue, materials for primary schools and Primary's Higher schools (elementary schools). (3) Catalogue and Specimens of Objects relating to Scientific Instruction granted to Training Colleges for elementary school teachers, as supplied by the firms—Braudier (anatomie humaine), Braudier, Deyrolle (musee for higher primary schools and natural history diagrams for training colleges). Anatomie V. (classic anatomy), Homme et V. 1.000, optical instruments for training colleges, and Diderot. (See this name). (4) Collection of Artificial Fruits for instruction in pathology in training colleges supplied by M. Courtois, 72 Rue Mouffetard, Paris. (4)

* Class I. is amalgamated with Class LI.

Apparatus for Instruction by means of luminous projections in normal and second grade schools. Projection examples drawn by M. Amand Durand, 69 Rue du Cardinal Lemoine. (5) Shed for Meteorological Instruments as supplied to all training colleges by the Education Department, through the Bureau Central Météorologique, 60 Rue de Grenelle, Paris (Director, M. Mascart), for the teaching of meteorology in training colleges. (See *Western Central Gallery* : *Outside*. See also Collection of Meteorological Instruments for training colleges supplied by M. Richard—barometer, thermometer, psychrometer, rain gauge, hygrometer, weathercock, etc. The observations taken by the students of training colleges are transmitted to the Bureau Central Météorologique. See *Annales du Bureau* and *Bulletin International*.)

66. VESSIOT, Inspecteur d'Académie à Marseilles.—(6) Specimens of a collection of rocks supplied by the Musée d'Histoire Naturelle. Notices and Documents on teaching in Marseilles by means of dissolving views (projections lumineuses), specimens of lessons, notes, taken at lectures by scholars.

67. MUSÉE SCOLAIRE, ÉMILE DEYROLLE (Elementary School).—A Series of Wall Pictures for Teaching Natural Science. This series is divided into three parts. The first illustrates the elements of natural science, and is intended for small schools. The second part illustrates metallurgical processes, coal-mining, glass-making, animals useful and injurious to agriculture, mushrooms and fungi, the most common poisonous plants. The third part, intended for girls' schools, illustrates the history of textile plants, such as flax, hemp and cotton; the ceramic processes, faïence or earth-ware, porcelain or china, stoneware, pottery; the cereals and the oleaginous and aromatic plants; the structure of a hen and changes of the egg during the process of incubation.

67a. MUSÉE DEYROLLE (Higher Primary School).—This collection has been prepared in order to meet the requirements of the higher primary schools. It consists of a wall picture (75 inches by 35 inches), representing the human skeleton; of another picture representing the skeleton of a bat; a collection of 100 useful and noxious insects, all indigenous to France; representatives of the myriapoda, arachnida, crustacea, annelida, vermes (amongst which there is to be found the trichina), the mollusca, echinodermata, polypes, sponges. Geology is illustrated by a collection of rocks, one of fossils, and one of minerals. Botany is illustrated by two herbaria, one of 100 plants, the other of 50 cereals. There are also instruments for collecting and preserving specimens, and a guide-book for carrying on these operations.

68. DEYROLLE, ÉMILE, 28 Rue de la Monnaie, Paris.—(1) Natural History Diagrams. (2) Typical Collections of Vertebrate and Invertebrate Animals, with appliances used for teaching natural history in training schools. (See also *Gallery, Royal Albert Hall*.)

69. ROUSSEAU (ANCIENNE MAISON, now termed Société Anonyme), 44 Rue des Écoles, Paris.—Materials for instruction in physics and chemistry (finishing course) in primary, secondary and training schools.

70. AUZOUX, MADAME VEUVE & MONTAUDON, Nephew and Successor of DR. AUZOUX), 56 Rue de Vaugirard, Paris.—Dr. Auzoux's *Clastic Anatomy*.—Collection of Anatomical Models composed of solid pieces which can be easily adjusted or separated, and removed piece by piece as in actual dissection. (Clastic, from *κλασσω*, I break off.) Since 1842 till his death (1880) Dr. Auzoux had been steadily working at this collection, which actually contains no less than 150 models of human or comparative anatomy and of botany. These delicate and minutely accurate scientific specimens are fabricated in the village of St. Aubin d'Escroville (Eure). Specimens exhibited:—(1) Clastic Man, incomplete, 1 m. 16 cent., for colleges and middle-class public schools. (2) Egg of Hen, 148 times larger than ordinary egg (size of *Epyornis* egg. Is. Geoffroy Saint-Hilaire), on which by means of four different sections, the structures of birds' eggs can be studied, and the formation of the germ followed to its complete development. This colossal model enables the metamorphoses of the vitellus and vitelline vesicle and the formation of the allantoid to be traced. It not only simplifies the study of the embryology of birds, but also facilitates that of the mammalia. (3) Heart of Adult, divided in halves, showing the disposition of the cavities, the muscular fibres, vessels, nerves, valves, and orifices of the vessels. (4) Eye, complete. Very large. On this new edition are seen, as in the preceding, not only the muscles, vessels, nerves, membranes, vitreous humour, crystalline lens, &c. (each part removable), but also the different microscopic layers of the retina, choroid, and iris described by modern anatomists. (5) Ear (temporal 60 c. long), new edition, showing the internal, external, and central parts in their minutest details, the enlargement of the auditory nerves, &c. This model reproduces the recent studies of Corti, Rosenthal, Lewenberg, and Reissner, and shows the action of the ossicles, the necessity of the *fenestra ovalis*, the *fenestra rotunda*, the membranous canals, the endolymph and perilymph, the double wall of the cochlea, the infundibulum, and the action of the air inclosed in the central ear, thus representing the wonderful mechanism of hearing in a manner that can be understood by all. (6) Larynx, showing the cartilages, muscles, vessels, nerves, tracheal artery and divisions of the bronchiae to their minutest ramifications. (7) Foot of Horse with the pastern, showing the hoof, podophyllous tissues, plantar pad, vessels, nerves, &c., all of which parts can be detached separately; the hoof is divided as by Bracy-Clark, and the Charlier shoe is placed on it. (8) Stock (*Cherianthus Cheir*), &c.

leaves, and flowers at different degrees of development; complete flower and ripe fruit, showing the two valves (silique), dehiscence commencing: *a.* Flower only; *b.* Pod. (9) Grain of Wheat (*Triticum sativum*, L.), 30 times the diameter, with its envelopes, embryonic layer, farinaceous mass, the embryo and its dependencies, which can be detached and replaced by an embryo in course of development by germination, and on which is seen all that constitutes the plantlet. (10) Spikelet of Wheat (*Triticum sativum*), very large, showing, 1st, the glumes; 2nd, the glumelles; 3rd, the ovary and the two styles with their stigmas; 4th, the stamens; 5th, the nectarial glands, before and after fecundation, from the researches of Prof. Bidard. (11) Cherry. Ripe, showing the different layers of the pericarp, the ovule and its envelopes. (12) Wood, piece of dicotyledonous woody stem (*Quercus communis*), three years old, greatly enlarged, upon which is shown the central pith, spiral vessels or tracheæ, medullary sheath, medullary rays, composition of woody layers, the annular vessels—rayed and dotted, lacuna, the duramen and sap wood, cambium separating the woody layer from the cortex; on this last, the leaflets being separate, can be seen the epidermis, the suberous and herbaceous layers, the latexiferous vessels, and the fibres of the liber.

71. LEMERCIER (MADAME VEUVE) 7 Rue Vavin, Paris.—Illustrations of Structural Anatomy by the late Dr. F. G. Lemercier.

(The numbers are those of the Lemercier Catalogue.) 1. 'Structural Anatomy of Man.' By the late Dr. F. G. Lemercier, who was long assistant of Dr. Auzoux.—2. 'Stomach expanded.' (2 parts).—3. 'Structure of the Stomach.'—4. 'Gastric Peptic Gland.'—5. 'The Same withered.'—6. 'A Cystose Gland.'—7. 'Gastric Mucous Gland.'—8. 'Glands of Brunner.'—9. 'Structure of the Small Intestines.'—10. 'Glands of Lieberkühn.'—11. 'Villus of the Small Intestines.'—17. 'Anatomical Model (after the London figure deprived of its skin).'—19. 'Maxilla, with its Support.'—20. 'Big Molar-Tooth.'—22. 'Typical Foot of the Horse.'—24. 'A Bean.'—25. 'A Gerin.'—26. 'A Small Nut.'—27. 'Two Grains of Pollen.'

72. TRAMOND, M., 9 Rue de l'École de Médecine, Paris.—Objects for teaching Natural History in normal schools, as supplied to the French Education Department.

73. MENNEGLIER, M., Navenne, Haute Saône.—Specimen of Herbarium for schools.

74. SOCIÉTÉ ANONYME D'ÉLECTRICITÉ, 39 Avenue Marceau, Courbevoie.—(1) Dynamo Electric Machine, with continuous currents. School model. (2) Accessories for demonstrating the effects produced by the machine.

75. LUTZ, Optical Instrument Maker, 82 Boulevard St. Germain, Paris.—(1) Collection of optical instruments in use in the training colleges. (2) Lamps and lanterns for dissolving views; appliances specially adapted for the primary schools.

CLASS LII.

(Rooms 7 and 8 and Corridor.)

Art Teaching.—(a) Apparatus, Models, and Fittings for Elementary Art Instruction in Schools; (b), Diagrams, Copies, Text-books, &c.; (c) Specimens of Art Work, Modelling, &c., in Schools.

MINISTRY OF PUBLIC INSTRUCTION & FINE ARTS.—(Fine Arts Section).—(1) Specimens of casts and prints to form an Art Museum for elementary schools, prepared according to the regulations of the Ministerial Commission on School Decoration. *a.* Art museum for boys' schools (see Room 7); *b.* for girls' schools (see Room 9). (Many schools have already been provided with similar collections.) Rapport of M. P. Mantz, with programme of Art museum for primary school, training colleges, and *Lycées*. (2) Types of School Prizes (*Bonpoints scolaires*) for elementary schools, sanctioned by the Commission of *L'Imagerie Scolaire*. Bonpoints, reward cards, and images by Ravaisson, Quantin, Hachette, Prunaire, Suzanne, Goupil, Lebet, &c. Report by M. Havard, president of the Commission on School Prizes (Room 8). (3) Collection of casts for teaching drawing in primary training colleges and schools of secondary grade. Programme of the course of studies—Drawing Test in examinations for the higher certificate—Minute of 23 January, 1881 (J. Ferry), fixing the programmes of the teaching of drawing in elementary schools. (4) Examination for the certificate to teach drawing. Two frames showing specimens of time drawings done at the examinations—*a.* for the 1st grade, *b.* for the higher grade. Two drawings from a relief executed in eight hours; perspective done in the same time. Three drawings from the living model done in eight hours. Drawing of anatomy done without copies.

VILLE DE PARIS. See Special Catalogue.

REIBER, ÉMILE, 54 Rue Vavin, Paris.—Panel (Room 7).—Exercises for the hand, the hand and eye, and the hand, eye, and the intelligence. Panel.—Alphabet of

forms. A B C of forms, or drawing taught as writing, graduated exercises in tracing for beginners of every age. 12 books for the master and 12 for the pupils. Three Panephlets on popular instruction in drawing. Album Reiber, 1st volume of the *Bibliothèque portative des arts du dessin*. This new method of teaching drawing aims at making the ordinary school-master able to teach himself elementary drawing with a very short preparation. (See also *Classes 39 & 48*.)

77. ARMEINGAUD, AINÉ, 45 Rue St. Sébastien, Boulevard Voltaire, Paris.—‘School Decoration.’ 5 Fauels of Pictures for Schools, printed on the wall-paper system.

78. PRUNAIRE, M., 59 Rue de Grenelle, Paris.—(1) Two Series of School Bon-points. (2) Three Prize Albums. (3) Two Series of Prizes in Envelopes.

79. QUEINTIN, M.—Specimens of Prizes for Elementary Schools (*bonpoints scolaires*), and Fine Arts. See *Ministry of Public Instruction*.

80. DELAGRAVE, CH., 15 Rue Soufflot, Paris. (See *Corridor*.) (1) A collection of 10 casts derived from the antique by Prof. Sobre. (2) Geometrical outlines by M. Thomas. (3) A course of drawing in 64 sheets. (4) Order of Architecture, by M. Avoine. A collection of casts illustrating the Corinthian, Doric, Ionian and Tuscan orders of architecture. (5) Method of Anatomy, by Paul Colin and Delrie. This consists of 9 basso-relievoes (height 39-37 inches), illustrating osteology, myology, and general anatomy. (6) Museum Collection, by Léon Chéderville, under the direction of MM. Claude Sauvageot, Auguste Racinet, and Louvrier de Lajolais. This consists of models executed, 1st, according to geometrical formulae; 2nd, according to types selected from antiquity, the middle ages, the renaissance, and the 17th and 18th centuries.

81. CERNESSON, L. C., 23 Rue Michel-Ange, Paris.—(1) Elementary Grammar of Design. (2) Pupils' Drawing Books.

82. RAVAISSEON, F., INSPECTOR-GENERAL FOR HIGHER EDUCATION.—(1) Collection of Models. (2) Reproductions of Masterworks of Art. (3) Diagrams and Portfolios.

83. D'HENRIET, M., 28 Rue Chabrol, Paris.—Rational Drawing Course: (1) Drawing from Copies. (2) Linear Drawing. (3) Drawing from Ornament.

84. ARMAND-CASSAGNE, M., 12 Rue du Bac, Paris.—Armand - Cassagne Course of Drawing.

85. BERNARD, R., Professeur at the College of Digne, Basses-Alpes.—A Manuscript Course of Drawing for Elementary Schools.

86. TRAINING COLLEGES.—Specimens of drawings, modellings, &c., done by the students of the Écoles Normales of Auteuil, Caen, Limoges, Le Mans, Orléans, Blois, Châlons sur-Marne.

87. GIBERT,—Grande Rue, Fontainebleau.—Results of a two years' course of drawing on the Cassagne method. Elementary modelling.

CLASSES L. & LIII.

Handicraft Teaching in Schools for Boys.—(a) Apparatus and Fittings for Elementary Trade Teaching in Schools. (b) Specimens of School Work.

Technical & Apprenticeship Schools. (a) Apparatus and Examples used in Primary and Secondary Schools for Teaching Handicrafts. (b) Models, Plans, and Designs for the Fitting up of Workshop and Industrial Schools. (c) Results of Industrial Work done in such Schools.

MINISTRY OF PUBLIC INSTRUCTION.—(1) Specimen of the Work of Pupils in Public and Private Schools. (2) Manual Work in School: a photograph of a picture, by A Trupheme, representing the school workshop with boys at work.

88. MINISTRY OF COMMERCE, 25 Quai d'Orsay, Paris.—(1) Schools for Apprentices. (2) Schools of Applied Art. (3) School Works.—*Works done in the National School of applied Arts (École des Arts et Métiers of Aix-en-Provence)*. Group 1.—Specimens from the Turning and Pattern shop.

Group 2.—Specimens from the Foundry workshop.

Group 3.—Specimens from the Smithy.

Group 4.—Specimens from the Fitting-shop.

Group 5.—Various specimens of machinery, constructed by the pupils of the school.

Group 6.—Theoretical work (cours autographiés, albums of drawings, carnets d'épures, programmes of the theoretical lessons).

Group 7.—Central group of various specimens of iron work and foundry (quincaillerie, fontes d'art, &c.).

The school of Aix aims at forming skilled artizans able to become foremen, heads of workshops, and masters of industrial firms well conversant in the practice of mechanical arts. The admission is only by competitive examinations. The practical instruction is given in four workshops, and comprises the work of the smithy, foundry, fitting-shop, turning, and pattern-shop. There are in each school 300 places of pupils, borders or scholars. The Scholarships, complete or partial, are given by the State, through the Ministry of Commerce, or by the Councils General of the Departments. The fees are 600 fr. per annum for non-scholars. The school was created in 1843. There are two other schools of applied arts in France, one at Chalons-sur-Marne, the other at Angers. (N.B.—*This exhibit is in the French Court, Central Western Gallery, main building.*)

VILLE DE PARIS. (See Special Catalogue.)

89. ÉCOLE NORMALE SPÉCIALE DE TRAVAIL MANUEL, 10 Rue Louis Thuillier, Paris (Director, M. SALICIS).—Works of the Students. Examples the order followed in the artistic drawing course. (For the notice on this school, see above showing Introduction page 86.)

90. SCHOOL OF THE RUE TOURNEFORT, Paris. Photographs showing the succession of work in every kind of handicraft teaching. This school is the first primary public school of France in which rudimentary trade teaching was combined with ordinary elementary instruction. It was established on its present footing in 1873. For ages of six to ten the children have three hourly lessons per week in manual work; boys of ten and eleven are taught drawing, modelling, carving, joiner's work, and smith's and fitter's work, whilst in their twelfth year of age, the instruction is specialized, some taking as their principal study modelling and carving; others joiner's work and cabinet making; others again forging and fitting; but all have to devote a certain portion of time each week to the other subjects comprised in the complete course of manual work. The school hours are from eight in the morning to six at night, and in the highest class eighteen hours per week are given to manual work. (Extracted from the Report of H.M. Commissioners on Technical Education, 1884.)

91. HIGHER PRIMARY AND PROFESSIONAL SCHOOL OF ROUEN (M. T. DELARUE, Director).—Collection of Works by Pupils of the 3rd, 2nd, and 1st Class.

92. HIGHER PRIMARY SCHOOL OF VOIRON, ISÈRE (École Primaire Supérieure), M. BERTHUIIN, Directeur.—Works from the School Workshops: 1 Crane, 1 Galvanometer, 1 Catch, 1 Electric Bell. This school was founded in October, 1882, in order to prepare for the creation of the National School of Higher Primary Education preparatory to Apprenticeship, which the town will soon possess. The school, meanwhile, aims at providing the industries and trades of the district with young men possessing the necessary theoretical knowledge, as well as valuable practical knowledge. The course of studies consists of lectures on ethics, reading, handwriting, grammar, composition, literature, history, geography, modern languages, arithmetic, geometry, algebra, trigonometry, descriptive geometry, mechanics, physics, chemistry, natural history, geometrical drawing applied to the industries, artistic drawing, book-keeping, music, and gymnastics. The workshop instruction includes modelling and moulding (clay, plaster, and cement), stone-cutting, joinery, carpentry, turnery (wood and metal), and blacksmiths' work. It is proposed to introduce weaving as a subject for workshop instruction. Special classes are conducted for candidates preparing for the Training Colleges of Primary Instruction, for the Schools of "Arts and Métiers," and the Veterinary Colleges, as well as for those who wish to enter the administration of public ways, such as the Post Office and Telegraph Departments.

93. VIERZON, PRIMARY SCHOOLS OF.—Works of the Scholars. (Art Teacher: M. Celerier, sculptor.) The entire range of instruction in this school is intended to be introductory to special apprenticeship schools like the École des Arts et Métiers. Works exhibited: 4 Burbotine frames, 5 plates decorated drawings, &c. Several of the works are exhibited by permission of the owners, and the price of the sale is indicated on them.

94. TECHNICAL SCHOOL, Évreux.—Works of the Scholars. (1) Album of graphic works (descriptive geometry and mechanics). (2) Mechanical models executed by the pupils in the school workshops: (a) Apparatus to show effects of eccentrics, &c. (b) Modèle de petit tour. (c) Oldham Joint. (d) Model of crane. (e) Modèle d'assemblage.

95. CHAIX, M.—Documents, &c., relative to Technical School for Printers. (See Class 38.)

96. LIVET INSTITUTE, Nantes.—(1) Plan of the Institution. (2) Documents relating to the school, its progress, and methods of teaching. (3) Works by the pupils: Watchmaking. This Institution has more than 400 pupils (boarders and day-scholars), and occupies a total area of 1½ acres. In the principal building are the dormitories, dining halls, infirmary, &c.; opposite to this is the portion containing the class-rooms. These buildings are connected on one side with the workshops, and on the other with the various offices of the administration. The Institution, which receives pupils from six years of age, aims at preparing young people for industry, trade, the navy, and various public administrations. There are five workshops—(1) Mechanics. (2) Joinery and Models. (3) Laboratory of chemistry. (4) Foundry. (5) Clock and watchmaking and mechanical works of precision. The machinery is set into motion by a steam engine (6-horse). The pupils make their own tools, as well as the school furniture and models for industrial drawing. Chemical analyses are undertaken in the laboratory for private persons and the trade. In recognition of his services to technical education, M. Livet has been appointed successively Officier d'Académie, Officier de l'Instruction Publique, and lastly a Knight of the Legion of Honour. The State and some of the Councils General maintain a number of exhibitors at the Institution. By a decision of the President of the Republic, May 16th, 1874, the pupils of the Institution are admissible to the rank of mechanical engineering student of the navy.

97. FOUNDLING SOCIETY OF PARIS (President and Founder, M. GEORGES BONJEAN), 47 Rue de Lille, Paris.—(1) Plans, Photographs of the Crozatier Farm School at Villepreux, Seine and Oise. (2) Papers relating to the Society. (3) Specimens of the Uniform adopted by the Scholars. (4) Diagrams.

98. PREVOST ORPHANAGE, Cempuis, Oise, P. ROBIN, Director.—Works by the Scholars: wood carving, iron work, model of gun in wood by one of the pupils; elementary scientific collections done by the pupils, &c.

99. PATRONAGE DES ENFANTS DE L'ÉBÉNISTERIE, Fondé en 1866. Founder and President, H. LEMOINE. (See notice on this institution, Room 48.) A carved frame in beech, done by the pupils of the Patronage.

100. INSTITUT INDUSTRIEL ET AGRONOMIQUE DU NORD, Rue Jeanne D'Arc, Lille (Director, M. OLRY). This school (on which see H. M. Commissioners' report on technical instruction, 1882, v. I. p. 86) was founded (1872) and is maintained by the département du Nord and the city of Lille, and it also receives a subvention from the State. It comprises two distinct schools, the Industrial School and the Agricultural School. The instruction in the Industrial School has for object the formation of managers and directors of works for the North of France, especially for the sons of persons engaged in industry; that in the Agricultural School is for the purpose of giving the necessary scientific knowledge to the sons of the landed gentry and gentlemen farmers, and includes the so-called agricultural industries, such as the sugar manufacture and distillery. (Report above cited, p. 87.) Works exhibited: Drawings by students, plans, examples of work done by students in the workshop. Examples from the weaving school. Products from the chemical laboratory. (See Annexe to the *City and Guilds Institute*.)

101. TECHNICAL SCHOOL FOR GIRLS OF ROUEN, Rue Beauvoisine.—(Ecole Professionnelle et Ménagère). Specimens of Needlework and Cutting Out by the pupils.

CLASS LIV.

(Rooms 10 and 11.)

Schools for the Blind and for the Deaf and Dumb.—(a) Apparatus and Examples for Teaching; (b) Specimens of School Work.

102. MINISTRY OF THE INTERIOR, NATIONAL INSTITUTION FOR THE DEAF AND DUMB (DR. PEYRON, Director), 254 Rue St. Jacques, Paris.—Works executed by the Inmates, Books, Views of the Institution, and Specimens of Uniform Orthophony (method of Dr. Colombat—Clinical Otology, audrometer of Dr. Charrière and Dr. Pile; Spiromètre, Classe d'Articulation, &c.). (See Room 10.)

103. SOCIÉTÉ POUR L'INSTRUCTION ET LA PROTECTION DES SOURDS-MUETS PAR L'ENSEIGNEMENT SIMULTANÉ DES SOURDS-MUETS ET DES ENTENDANTS-PARLANTS.—Publications relative to the phonemic method adopted for the instruction of the deaf and dumb.

104. MINISTRY OF THE INTERIOR, INSTITUTION FOR THE YOUTHFUL BLIND (Director, M. ÉMILE MARTIN), 56 Boulevard Montparnasse, Paris.—Works by the Inmates. (See *Notice on this Institute at Room 11, No. 1544.*)

105. SOCIÉTÉ DES ATELIERS DES AVEUGLES (President, M. LAVANCHY CLARKE), 1 Rue Jacquier, Paris.—Brushes, Feather Dusters, &c., made by the adult blind.

106. MAGNAT, M., Director of the Péreire School.—Works for the Instruction of the Deaf and Dumb. (The same works can be adapted for ordinary schools.)

107. CHERVIN, DR., 10 Avenue Victor Hugo, Paris.—Table showing the geographical distribution of stammering in France.

CLASS LV.

Literature, Statistics and Diagrams relating to Group 6 and to the Effects of "Cramming" and Overwork on the Young, &c.

MINISTRY OF PUBLIC INSTRUCTION.—(1) Table giving extracts of the laws rendering elementary education in France, free, compulsory, and secular. (2) Documents relative to teaching in France. (3) Reports, Papers, &c., relating to second grade advanced education and learned bodies; also to technical and professional education. (4) Catalogue of Books, published under the sanction of the department. (5) Specimen of a collection of books granted by the Education Department to every training college to form a special library, for the use of professors and assistant masters and mistresses. These libraries receive from the Ministry of Public Instruction, as a nucleus, the works named in the list of the exhibits. There are at present 86 training colleges (men's) and 57 training colleges (women's) in France. All have received those grants of books. There are also in the chief towns of *cantons* libraries provided for the use of teachers of all schools. The number of those libraries was, according to the latest statistics, 2,507, possessing together 662,319 volumes. They receive also a nucleus of the works mentioned in the exhibited catalogue. (6) Documents relative to elementary education:—(a) Statistics of the schools, masters and budget of primary instruction; statistics; new statistics, 1884, O. Gréard; Grande statistique sur l'Enseignement primaire de la Seine; Decrees and minutes by the conseil supérieur; Reports of school inspectors; états de situation, 1879-81; Projets de résolutions votés dans les conférences d'instituteurs.

108. PEDAGOGIC MUSEUM, 42 Rue Lhomond, Paris (Director, M. BERGER, Inspecteur général de l'Instruction publique).—This Museum has been erected in pursuance of a decree of the President of the Republic, on the motion of M. Jules Ferry, Minister of Public Instruction, May 13th, 1879. It constitutes a permanent scholastic exhibition, and a centre of information on primary instruction in France and foreign countries.

This establishment includes five sections:—(1) School Furniture (*matériel scolaire*).—Plans of schools, types of class-room furniture. (2) Teaching Apparatus (*appareils d'enseignement*).—Diagrams, models, geographical, scientific and technological collections. (3) Collections of Works done by pupils (boys and girls), in the class-room and workshop. (4) Documents bearing on the history of education in France. (5) Central Library.—Books for teachers, books for pupils, school libraries, popular libraries. The Museum Library containing, at present, about 17,000 works, 6848 of which are derived from a valuable collection of the best treatises on education in all languages, formed by Inspector-General Rapet, and acquired by the State, in virtue of the law of June 5th, 1880. In January, 1882, there was established a circulating library, intended to supply helps for study to the teaching staff; 230 sets of diff. rent works compose the three sections of it—Literature, Science, Pedagogy—and are sent, free of expense, to all parts of France and Algeria. 124 newspapers (53 published in France, 71 published abroad), mostly relating to education and teaching, are received at the Pedagogic Museum, and put at the disposal of the public. A monthly scholastic publication, the "Revue Pédagogique," has since July, 1882, become the organ of the Musée Pédagogique, and is edited under the supervision of an Editing Committee appointed by the Minister of Public Instruction. The Museum is open daily from 10 a.m. to 4 p.m. to persons provided with students' tickets (*cartes de travail*), and to the public on Sundays and Thursdays. The *cartes de travail* are issued at the Musée Pédagogique, and at the Ministry of Public Instruction (Direction of Primary Instruction, 5th Bureau).

The Musée Pédagogique is exhibiting:—(1) A notice explaining the origin of the Museum.

its organisation, and the services it renders. (2) A specimen of its catalogue. (3) Three boxes, containing specimens of the works sent out by the circulating library. (4) Three statistical tables, showing the development of primary instruction in France. (5) Two photographs, representing travelling caravans (or excursions for special studies by students of training colleges).

109. CERCLE PARISIEN DE LA LIGUE FRANÇAISE DE L'ENSEIGNEMENT, 175 Rue St. Honoré, Paris.—Documents and Diagrams. This society, founded in the year 1867, was incorporated in the year 1880. It numbered 2,480 members in 1883, and the annual subscriptions amounted to 22,100 francs (£884). This society distributes books, maps, &c., to various libraries (popular, communal, schools, regimental, &c.) in France, Algeria, and French colonies, and organises public lectures, illustrated by dissolving views. The total number of adherents to the Ligue de l'Enseignement is 200,000 members, divided between 1,500 branches spread all over France. The secretary of the Ligue is M. Emmanuel Vauchez, 175, Rue Saint Honoré, Paris.

110. SOCIÉTÉ POUR L'INSTRUCTION ÉLÉMENTAIRE, 14 Rue du Fouarre, Paris.—Syntoptic Table of the Works of the Society.

111. L'UNION FRANÇAISE DE LA JEUNESSE, 157 Boulevard St. Germain, Paris.—Various Documents. Scholars' Works, &c.

112. DE SABATIER PLANTIER, H., Ners, nr. Vézénobres, Gard.—(1) Publications relating to children's entertainments.

113. SOCIÉTÉ NATIONALE POUR L'ENCOURAGEMENT ET LE DÉVELOPPEMENT DE L'ÉDUCATION MORALE, CIVIQUE ET MILITAIRE EN FRANCE. (See *De Sabatier*, above.)

114. TESTON, A., Montpellier, Hérault.—Educational Works, 3 vols.

115. PICHE, M., 8 Rue Montpensier, Pau.—(1) Documents relative to the Cantonal Museums. (2) Documents relating to the *cercle populaire d'éducation* at Lunéville, presented by the Sous-Préfet at Lunéville, M. E. Lafargue.

116. DUJARDIN, LÉON, Juillac, Corrèze.—(1) Manuscript on the Creation of Cantonal Institutes. (2) Placards.

117. DOULIOT, E., Principal of the College and Industrial School, Épinal.—Documents relating to Scholastic Excursions, Regulations, Photographs, &c. (*Caravanes scolaires*).

118. SOCIÉTÉ DES FÊTES D'ENFANTS, 8 Rue des Saintes Maries, Nîmes, Gard.—(1) Statutes of the Society. (2) The Education of Patriotism.

119. GROULT, EDMOND, Lisieux, Calvados.—(1) Five Year-Books of the Cantonal Museums. (2) Syntoptic Table of a contemplated Cantonal Museum.

120. DE MALARCE, M. (Secretary to the Congress on Provident Institutions), 68 Rue de Babylone, Paris.—(1) Scholastic Savings Banks. (2) Documents and Diagrams relative to the *épargne scolaire*.

121. DELVAILLE, C. (DR.), formerly Adjoint au Maire, Bayonne.—Documents, Reports, &c., on the Bayonne Municipal Schools.

122. ROTHSCHILD, M., 18 Rue des Saints Pères, Paris.—Scientific Works for School Prizes and School Libraries.

123. RACT et FALQUET, 16 Rue Cassette, Paris.—Maps and School Books.

NARJOUX, M., 3 Rue Littré, Paris. (See *Group 4 in the Western Central Galleries, Class XL*, No. 50.)

124. 'L'ÉCOLE,' Scholastic Journal.—Office, 9 Galerie Colbert, Paris.

125. CARDOT, M., 377 Rue des Pyrénées, Paris.—Historical Notice of the Chair Desk.

126. ALSATIAN SCHOOL (M. RIEDER, Director).—Plans, Documents, &c. (See *Group 4*.)

127. DESCOUNUBES, Directeur de l'École de Morceix (Landes).—Plan, Documents, and Notes on the Schools of the Compagnie du Chemin de fer du Midi at Morceix.

128. REVUE DE L'ENSEIGNEMENT SECONDAIRE DES FILLES, a Periodical published in Paris.—Collection of the last year's numbers. Two Documents on Secondary Education of Girls in France. The law which regulates the secondary education of young girls was voted by the French Parliament in 1880. Before that time this education was left almost without any supervision from the State. Now (in 1884) there are in France 19 lycées and 12 colleges for young girls. These establishments are, according to the towns, boarding and day schools, or day schools only, or day schools in which the students are under a certain supervision. The creation of lycées and colleges is proceeding at a rapid pace.

CLASS LVI.

Collective Displays of School Work and Appliances. School Museums.

MINISTRY OF PUBLIC INSTRUCTION & THE FINE ARTS.—(1) Portfolio representing interiors of French schools, photographed by M. Pierre Petit, Place Cadet, Paris. (2) Collective display of school work in elementary schools, urban and rural.

CERCLE DE LA LIBRAIRIE, Paris.—Collective exhibit. (See *Class XLVIII.*)

129. ACADEMIC INSPECTORATE OF THE CÔTE-D'OR (Inspector, M. DESCHAMPS, Dijon).—Collective Display of School Work, showing the work of children during one month and one year. (1) Work done in a school with a single class-room. (Ecole de Bringes). (2) Work done in boys' and girls' schools containing several class-rooms.

130. PAYSANT, M., Préfet de l'Aude, Carcassonne, Aude.—Scholastic Museum, containing several categories.

131. DANZAC & CIE., Naujan, near Bordeaux.—Specimen of a Scholastic Museum, M. Eugène Danzac, a naturalist, has formed this collection, in order to supply the schools with a guide for the study of natural history. This collection contains specimens of the various classes and orders, and gives instructions in the art of collecting, preparing and preserving animals and plants of all descriptions. A collection of minerals and rocks illustrates the study of geology.

131a. DORANGEON.—Scholastic Museum (Ch. Delagrave, publisher). This is an interesting collection illustrating the processes of 75 trades, and containing more than 1200 samples and specimens. Moveable spheres for the study of Cosmography, by A. Letellier. This apparatus, highly recommended by the eminent scientist Abbé F. Moigno, represents the real movement of the earth and of Jupiter around the sun, or else the apparent movement of the sun on the ecliptic and the real movement of the earth around the sun at the same time.

For DEYROLLE'S SCHOOL, Museum, see *Class 51, Corridor.*

HACHETTE et CIE., Musée Sauray, see *Class 51, Corridor.*

132. REGRAIN, A., Chamblet, near Montluçon, Allier.—Scholastic Museum made by the pupils and master. (See *Corridor.*)

VILLE DE PARIS.

(Extract from the Catalogue de l'Exposition Spéciale de la Ville de Paris)
(Western Central Gallery.)

I. GROUP IV.—THE SCHOOL.—(*Service de travaux d'architecture.*)—Plans of Schools: (1) Training college for teachers at Auteuil, near Paris; architect, M. Salleron; finished in 1882; outlay, 2,025,000 francs, including the cost of the school furniture which amounted to 175,000 francs. (2) Higher primary school, Arago, Place de la Nation, Paris. Cost, 980,000 francs. This building contains 12 class-rooms, 2 large amphitheatres, 1 examination hall, a library, 3 drawing class-rooms, 1 modelling-room, &c. Architect, M. Deconchy. (3) Boys' primary school, Avenue Duquesne, Paris; M. Leroux, architect. (4) Infant school (*asile*) for 220 children, Rue Jourdain, Paris; architect, M. Salleron. (5) Elementary school for boys and girls, Rue Blanche; architect, M. Salleron. (6) Specimen of temporary schools; architect, M. J. A. Bouvard. In order to ensure the immediate execution in the metropolis of the law of March 28, 1882, making attendance at school compulsory, the town of Paris was obliged to construct in great haste several temporary buildings destined to receive the children, for whom there was no accommodation in the schools. A system of light construction in wood, with double-existing partitions, has been adopted, and enabled the municipality to open, within five months after the promulgation of the new Act, 58 new schools accommodating 15,000 children. (7) School group (containing a school for boys, a school for girls, and an infant school), Rue Oudinot, Paris; architect, M. Deconchy.

[For fuller details, see the *Special Catalogue of the Ville de Paris*. See also *Gymnase Voltaire*, above at Class XXXIX.]

II. GROUP VI.—EDUCATION—(*Direction de l'Enseignement primaire.*)—M. Carriot, Directeur; M. Duplan, sous-directeur. (1) Documents relative to the organisation of the institution of public instruction of Paris. (See specially the *Notice sur les établissements d'enseignement public de la Ville de Paris*, 1864.) (2) Pedagogical works of the male and female teachers.

Primary Schools.—Teacher's desk; school table (2 seats), combination table for the writing, drawing, or needlework class, slated blackboard, compendium metrical, counter, geographical appliances; specimen of a school museum organized by the teachers and pupils; photographs; work done in school, &c. Specimen of school rewards. Honour List prize, reward cards, &c.

Infant Schools.—School furniture; views of school-rooms and dependencies, photographs, &c.; Work done in infant school.

Higher Primary Schools (boys'), 12 to 17 years old.—Specimens of work done by pupils; teaching of physical and natural sciences; photographs showing a manipulation room, a school museum, and a school workshop.

Higher Primary Schools (girls'), 13 to 17 years.—Specimen of school work. Time table. Specimens of book-keeping work; views of class-room, of amphitheatre, and a model kitchen.

Instruction of Adults—Night schools for scholars more than 15 years old. Programmes of commercial teaching for young men and young girls. Specimen of work done in classes.

Teaching of Drawing in Elementary Higher Primary and Night Schools.—Specimen of the progressive series of models. Drawings by the scholars. Photograph showing a plan of drawing and modelling.

Teaching of gymnastics and drill in schools.—Specimens of the apparatus employed for the teaching of gymnastics. Photograph of scholars during a gymnastic lesson. Model of uniforms of school battalions. Photograph showing boys at drill.

Handicraft teaching in elementary schools for boys (6 to 13 years old).—Series of work done by boys. Views of workshops.

Handicraft teaching in elementary schools for girls (6 to 13 years). Teaching of needle-work. Specimens of work; cutting out.

Professional teaching for young men (13 to 17 years).—École Municipale Diderot, 60 Boulevard de la Villette, Paris. Specimen of work done in the school smithy, carpentering, turning, and fitting-up shops; locksmiths, and other works; photographs of school workshops and refectories.

Professional teaching for young girls (12 to 17 years).—Specimen of work done in the china painting studio. Corset making, embroidery, artificial flowers, &c. Photographs of the work-room of the Rue Violet School—Specimen of drawings by girls of the Schools of Rue Violet, Rue Bossuet and Rue Ganneron.

École Municipale de Physique et Chimie Industrielles, 42 Rue Lhomond.—(Work by students, 14 to 19 years).—Photographs of the Laboratories.

INSTITUT DES FRÈRES DES ÉCOLES CHRÉTIENNES, Rue Oudinot 27, Paris.—Specimens of School Work and Appliances. Work done by the pupils of the Schools of Paris, Lyon, Beauvais, Dreux, Annecy, Chambéry, Lille, Roubaix, Reims, &c. Also from the French School of Christian Brothers at Rome. (See No. 1560, Room 5.)

EXHIBITS FROM FOREIGN TECHNICAL SCHOOLS.

(Annexe to the Central Institution of the City and Guilds of London.)

INSTITUT INDUSTRIEL ET AGRONOMIQUE DU NORD DE LA FRANCE (Director M. A. OLROY).—Drawings by Students, Plans. Specimens of Work done by the Students in the Workshops. Specimens of Work from the Weaving School.

ADMINISTRATION FOR APPLIED ART SCHOOLS IN THE GRAND DUCHY OF BADEN, KARLSRUHE.—One Hundred Sheets, partly pencil, partly coloured. Examples. Specimens of School work belonging to the various courses, and comprising architecture, applied art drawing, freehand, surface painting, sketching from nature, figure drawing, designs for exercise, and prize exercises for the various courses. *Books.*—“Ornamental Formenlehre,” by Professor F. S. Meyer. “Anatomy.” Portfolio, with numerous reproductions from designs, by Herr Götz, Director. Specimens of decorative painting. Specimens from the wax-modelling course. Casts from the wax-modelling course. Works from the wood carving-course. Models of Ornament (in plaster). Figure Models (in plaster). Book with programme of exercises for the monthly prize. Bound yearly reports for the Session 1882-83.

GRAND DUCAL WOOD CARVING SCHOOL, Furtwangen, Baden.—The Grand Ducal School of Wood Carving at Furtwangen was founded in 1877, and opened on the 1st May in that year. The object of the establishment is to elevate and further the art of wood carving in the Black Forest, with special reference to the manufacture of clock cases. The municipality of Furtwangen charges itself with the localisation, and has in addition to look after the heating and lighting, all other expenses being defrayed by the Grand Ducal Government. The establishment is under the control of the Ministry of the Interior, and has a director, assistant, and technical master. Every boy who is mentally and physically sound, and is over fourteen years of age, is eligible for admission. There is no previous course of instruction necessary, nor, on the other hand, is any undertaking given as to how long a scholar must remain in the establishment. The usual term is, however, two to two and a half years. The local management is entrusted to a Committee of Inspection, comprising the following persons:—Herr R. Bichweiler, Architect, Director of the Grand Ducal Landesgewerbehalle, President; Herr E. Grieshaber, Burgermeister, Vice-President; Herr S. Siedle, Representative of the Villengen District; Herr F. Türgler, of Waldkirch, Representative of the Freiburg District; Herr E. Kreuzer, Town Councillor, Furtwangen; Herr H. Hettich, Manufacturer, Furtwangen; Herr O. Furtwangler, Manufacturer, Furtwangen; Herr J. Koch, President and Director of the School. The school is provided with good models and drawing examples, and a certain sum is annually set apart for procuring the means of instruction in the school factories.

List of objects contributed to the International Health Exhibition from the Grand Ducal School of Wood Carving at Furtwangen, Baden.

(A) *Carving.*—Pilasters, “Filling-in,” Garlands of Flowers, Rosettes, Cups, Ornaments, Album Covers, Photograph Frames, Wreath of Oak and Laurel, Clock Case, Flower Wreath, Nosegay, “Lehrgang der Schnitzereianfinge.”

(B) *Plaster Models.*—Cup, Garland of Flowers, Ornaments, Swing with Rosette, “Enhei’aub.”

GRAND DUCAL WATCH-MAKING SCHOOL, Furtwangen, Baden.—A Clock, made by the students.

ROYAL ACADEMY OF ARCHITECTURE, Stuttgart (Director Prof. EGLE).—(1) Plans and elevation of the house, also details as to the apportionment, erection, site and management of the school, together with plans and programmes of the various courses of instruction; also statutes and reports on the examinations and their results, &c. (2) Scholars’ works: (a) Manuscript Volumes and Drawing Portfolios, prepared by the scholars under the teacher’s directions, models prepared by the scholars, photographs and school works. (b) *Drawings and Designs* by scholars. (3) Wall Tablets for practising the pupils.

WORKMEN'S COMMUNAL SCHOOL, Stuttgart (Director Prof. GAUPP).

—Drawings and Casts made by Students.

COMMUNAL SCHOOL FOR FEMALE INDUSTRY, Reutlingen.

(1) Specimens of Needlework, Embroidery, Lace, &c. (2) Designs.

PRIVATE SCHOOL FOR FEMALE INDUSTRY, Stuttgart.—(1) Specimens of Needlework, Embroidery, &c. (2) Designs.**UNITED INDUSTRIAL ART SCHOOLS OF LOWER AUSTRIA, Technological Museum, I. Eschenbachgasse II., Vienna.**

A. *School Works, Special Course for Cabinet Makers and Joiners.*—Seven Ornamental Drawings. 33 Designs for Cabinet Work. 11 Designs for Joinery. 7 Geometrical Drawings. 9 Working Drawings. Collection of Drawing Exercises for High Class Woodwork.

B. *School Works, Special Course for Training Female Workers in Basket Weaving.*—Twenty-five Freehand and Technical Drawings.

C. *Course of Instruction published by the Technological Museum.*—J. Burkart. Collection of the most important European woods used in the arts in characteristic sections. Price 10 florins (Austrian). F. Afh, "Patterns for Basket Weavers." (In German.) D. Avanzo, "Designs for Turnery Objects of Domestic Industry," 2 parts. (In German.) T. Tapla, "Exercises for Instruction in Geometrical Drawing and Projection. (In German.) 15 Diagrams for Elementary Instruction in Turnery. 4 for similar instruction in Wood Carving. 50 Designs for Joinery (old). 8 Plates and 50 Designs for Joinery (new). Original designs from the work on the Furniture of the Renaissance, period 16th and 17th centuries, by D'Aranzo, Architect and Professor at the Technological Museum. 30 Plates. 2 Cases containing Joinery Models.

D. *Objects Illustrating the Work of the Museum.*—1 Diagram showing the development of the Museum. 3 Plans of the Technological Museum. Yearly Report for 1883. Publications of the section for Woodwork, years 1880-1883, and 5 numbers for 1884. Similar publications from the Dyeing, Printing, &c., section, 15 in number. 27 Wall Diagrams for Technological Instruction.

SCHOOL OF INDUSTRIAL ART, GENEVA.—(1) Ceramic Panel. With coloured border in walnut frame. Designed and executed by the pupils (ladies) of the Ceramic Class. Price 2000 francs. (2) A Carved Wood Chest with ironwork and key in chiselled steel. Designed and executed by the pupils (gentlemen) of the class for Modelling, Wood Carving and Engraving. Price 4000 francs. (3) A Silver Cup, finely chased. Designed and executed by a pupil of the Modelling and engraving class. Price 1800 francs. (4) A Bronze Statuette, Calvin. Designed and executed by a pupil of the Modelling and Engraving class. Price 350 francs. (5) A Bronze Statuette, Luther. Designed and executed by a pupil of the modelling and engraving class. Price 350 francs. (6) A Bronze Group, William Tell. Designed and executed by a pupil of the modelling and engraving class.

BELGIAN EDUCATION SECTION.

Queen's Gate Annexe.

GROUP 4—THE SCHOOL.

CLASS XXXIV.

Designs and Models of Improved Buildings for Elementary Schools, Infant Schools and Crèches.

- 151. DEMANY, E. Liège.—School Plans.
- 152. DEVIVIER & HANSEN, Spa.—School Plans.
- 153. FUMIÈRE, TH., Schaerbeek.—School Plans. (*See Groups III. and VI.*)
- 154. HOSTE, J., Blankenberghe.—School Plans.
- 155. HUBERT, J., Mons.—Plans for a Normal Training School for Teachers.
- 156. MINISTRY OF PUBLIC INSTRUCTION, Brussels.—Plans and Photographs of Schools and Class-Rooms of all grades, Teachers' Residences, &c.
- 157. QUÉTIN, E., St.-Gilles-les-Bruxelles.—Plans and Photographs of Schools.
- 158. SCHÆFFER, F., Antwerp.—Plans for Hot Water Apparatus, Bath Rooms, &c.
- 159. SERRURE, E. C., Saint-Nicolas.—Designs for Town and Country Schools.
- 160. VERSTRAETE, CH., Ghent.—Buildings for the Boys' Orphanage at Ghent. Book containing an explanation of the system. (*See Group VI.*)

CLASS XXXV.

Apparatus and Fittings for Warming, Ventilating, and Lighting Schools, School Latrines, Closets, &c.

- 161. MINISTRY OF PUBLIC INSTRUCTION, Brussels.—Plans for heating and ventilation, models of stoves, &c.
- 162. QUÉTIN, E., St. Gilles.—Frame of Plans and Photographs of Schools, Scholastic Materials, &c.
- 163. RONVAUX, DR. L., Namur.—Ventilating Stove.
- 164. VALLEZ ET DEMAECHT, Brussels.—Hygienic Appliances for Heating and Ventilating (called L. H. Vallez's Stove), used for Schools, Hospitals, &c.
- 165. VAN HOECKE, F., Ghent.—Hot-water Apparatus, applicable to Schools, Boarding-Houses, Shops, Workrooms, Greenhouses, &c.

CLASS XXXVI.

Special School Fittings for Storing and Drying Clothing.

- 166. MINISTRY OF PUBLIC INSTRUCTION, Brussels.—Specimens of Coat Racks, Umbrella Stands, and Wardrobes.

CLASS XXXVIII.

Precaution in Schools for preventing the Spread of Infectious Diseases, School Sanatoria, Infirmarys, &c.

- 167. DASTOT (DR. A.) Mons.—Granulous Ophthalmia in Schools, with treatise on the Operation of Cataract.

168. MINISTRY OF PUBLIC INSTRUCTION, Brussels.—Documents. *Boites de Secours, &c.*

169. MINISTRY OF PUBLIC INSTRUCTION, Brussels.—Various Papers and Regulations relating to the Inspection of Schools, and the course to be adopted on the outbreak of infectious diseases.

CLASS XXXIX.

Special Apparatus for Physical Training in Schools, Gymnasia, Apparatus for Exercises, Drill, &c.

169a. MINISTRY OF PUBLIC INSTRUCTION, Brussels.—(1) Gymnastic Appliances and Instruments. (2) Plans and Views of Gymnasia, and Gymnastic Exercises. (3) Collection of Gymnastic Apparatus in use at the Normal State Schools; Official Regulations as to instruction in gymnastics in the various classes of schools, and also of the teachers of this subject. (4) Manual for the Gymnastic instruction of Boys, by Major Docx. (5) Similar Manuals for Girls by the same author.

CLASS XL.

Literature, Statistics, Diagrams, &c., relating to Group IV.

170. DU MOULIN (DR. N.), Ghent.—(1) The Epidemics at Nevele, at Landegem. Considerations on the prophylaxia, and (2) Inquiry into the Sanitary Condition of Ghent on the occasion of the Cholera Epidemic in 1866—Ghent, 1879.

171. FERSTRAERTS (DR. A.), Liège.—*Le Scalpel*, a weekly Journal, organ of the Scientific and Professional Interests of Medicine, Pharmacy, and the Veterinary Art. *Le Médecin de la Famille*, or the Art of Preserving Health, treating of practical hygiene and everything relating to hygiene and domestic economy.

172. HUBERT (J.), Mons. — Treatise on the Normal State School for Elementary Teachers, Mons.

173. MINISTRY OF PUBLIC INSTRUCTION, Brussels.—Programmes, Documents, Statistics, &c. Publications relative to Scholastic Hygiene. The list is posted at the side of the collection of works exhibited.

174. MIRGUET, V., Directeur de la Section normale primaire de l'État, Huy.—(1) *L'Observateur*, scholastic review; years 1882, 1883 and 1884. (2) *Cours de pédagogie et de Methodologie* for pupils in elementary schools. (3) *Notions de Psychologie* for similar pupils.

175. RENARD, H., Jambes.—Résumé of a Practical Course of Accounts. Outlines of Industrial Political Economy.

176. MINISTRY OF THE INTERIOR, Brussels.—Various Publications, Plans, &c., relating to Group IV.

GROUP 6.—EDUCATIONAL WORKS AND APPLIANCES.

CLASS XLVII.

Crèches and Infant Schools.—(a) Apparatus and Fittings for Crèches and Infant Schools; (b) Games, Toys and Kindergarten Amusements; (c) Models and Appliances for Teaching; (d) Examples of School Work.

177. SOCIÉTÉ ANONYME: LA CONSTRUCTION INDUSTRIELLE, Brussels.—Patent School Desks.

178. CRÈCHE MARIE-HENRIETTE, Antwerp.—(1) Complete Cradle. (2) Reports, Regulations, Photographs, Utensils, &c.

179. DE MEESTER, A., Bernissart.—(1) Selection of Reading Lessons for Elementary Schools. (2) Elementary Course of the French Language, 3 vols. (3) Useful Knowledge, with Calculations, 3 vols. (4) Mental Arithmetic, 3 vols. All these works are remarkable for their practical character.

180. DE TOEKOMST, Antwerp.—Essay on Popular Libraries, mode of working and results obtained. Annual reports for 20 years.

181. **GALLET, GUILLAUME**, St. Josse-ten-Noode.—Kindergarten, Rue du Moulin 47, à St. Josse-ten-Noode, under the direction of Madame Gallet.

182. **MINISTÈRE DE LINSTRUCTION PUBLIQUE**, Brussels.—(1) Crèches and Infant Schools. (2) Fröbel and other toys, works of the mistresses and children. (3) Samples of Furniture and School Fittings. (4) Conferences for the teachers, to familiarise Models of Instruction. (5) The Fröbel Normal Course. (6) Registers. (7) Works.

183. **SERESSIA, J.**, Huy.—“L’École Communale,” scholastic, scientific, and literary review, published by the Société d’Instituteurs at Huy.

184. **THYES, E.**, Ixelles.—Preliminary exercises in practical linear drawing.

185. **WINDELS, D.**, Brussels.—Gifts and Toys for Kindergarten.

CLASS XLVIII.

Primary Schools.—(a) Apparatus and Fittings; (b) Models and Appliances for teaching; Text-books, Diagrams and Examples; (c) Specimens of Work in Elementary Schools.

186. **AERTS, F.**, Nivelles.—Instruction in Vocal Music. Various Books on this subject.

187. **BLONTROCK, H.**, Laeken.—“Le Moniteur des Instituteurs Primaires,” weekly scholastic review.

188. **BOUILLON, A.**, Brussels.—(1) Practical Choir Singing. (2) Selection of 100 Canons with words. (3) Collection of School Chants. (4) Graduated Exercises.

189. **BRAUN, T.**, Government School Inspector.—(1) Classical and scholastic works. (2) “L’Abeille,” a scholastic review. (3) Miscellaneous Educational Works.

190. **CALLEWAERT BROTHERS**, Brussels.—(1) Classical Works. (2) School Furniture. (3) Speciality in Maps and Methods of Writing approved by the Council of Improvement.

191. **LA CONSTRUCTION INDUSTRIELLE**, Brussels.—(1) Models for Instruction in Normal and Reformatory Schools. (2) School Desks of various heights.

192. **DENYS-CALLEWAERT, P. P.**, Comines.—*De Volkschool* (School of the People). Monthly Review.

193. **DESMET, L.**, Ghent.—*De Vereeniging*, Teacher’s Journal.

194. **DIERCKX, J.**, Schaerbeek.—Works on Teaching and Hygiene.

195. **DOCX, G.**, Inspector of Schools (for Gymnastics).—Official Handbook on Gymnasia Teaching. *La Gymnastique Scolaire*, numbers for six years. Various works on this subject.

196. **THE CHRISTIAN BROTHERS’ INSTITUTE**, Aloste Establishment.—(The Christian Brothers in Belgium conduct 80 Elementary schools. 3 Professional Boarding Schools. 2 Normal Schools. 4 Schools for Architecture and Printing. 15 Classes for Arithmetic, Languages, Commerce, Drawing, &c., for adults.)—Collective Exhibit of School Works, Models, and Collections to illustrate natural history and physics.

196. **CHRISTIAN SCHOOLS** (Various Towns).—Collective Exhibit.

197. **ARENS, ANT.**, in religion, F. **MARIANUS**, Provincial.—School Works.

198. **DE KOSTER, CH.**, in religion, F. **MADIR**, Visitor.—(1) Flemish Reading Book. (2) Four Reading Cards, also in Flemish. (3) Lessons in Flemish, 2 parts (in French).

199. **VAN ACHTER, ACH**, in religion, F. **ACHILLE**.—Theoretical and practical Treatise on Method. Teacher’s *Vade-Mecum*.

200. **PIRON, J. J.**, in religion, F. **MÉMOIRE**.—(1) Method for demonstrating projections by movable models. (2) French Grammar. (3) Books on orthography, syntax, elementary arithmetic. (4) Metrical exercises with solutions.

201. **VAN DEN BROECK, P. L.**, in religion, F. **Marcy**.—Works on Arithmetic, Geometry and Trigonometry (1 in Flemish).

202. **MATHIEU, C. J.**, in religion, F. **MATHIEU**.—(1) Great Events in History, Universal History, Ancient Mediæval and Modern History. (2) History of Belgium. (3) The Province of Luxembourg.

203. **DE PAUW, CH.**, in religion, F. **MARES JOSEPH**.—Drawing Books.

204. LEROY, ALPHONSE, in religion, F. MANSUY-JOSEPH.—(1) Course of Freehand Drawing and drawing with the aid of instruments. (2) Selection of reading Lessons in prose and verse.

205. GOCHET, J. B., in religion, F. ALEXIS-MARIE, Carlsbourg.—(1) Complete course of Geography: six large maps, eight small, four diagrams, one map case. (2) A series of ten manuals for master and pupils (3 in Flemish). (3) 7 Atlases, 14 Exercise Books in Geography, 6 Plaster Models in relief. (4) Submersible hypsometric model. (5) Reliefs of the Provinces of Namur, Liège, and Luxembourg. (6) Course of Botany and Synopsis of the Belgian Flora. (6) Course of Agriculture and Gardening.

206. ST. JOSEPH'S INSTITUTE, Rue des Longs Chariots, Brussels.—Adult Drawing Schools. Specimens of work given during the first, second, third, and fourth years of instruction, and of the work done from such specimens.

207. FREE ELEMENTARY SCHOOLS of Brussels, Tournai, Verviers, Namur, Liège, Tamines, &c.—Collective Exhibit of Scholars' Works.

208. ST. LUKE'S SCHOOL, Ghent.—Drawing Works. Elementary Work of the first and second years. Works from the Decorative Course, the Building Course, and Architecture Course.

209. LAVELETTE-WEINKNECHT, Brussels.—Collection of sample of skins in use by furriers (for a school museum).

210. MANCEAUX, H., Mons.—*Le Messager des écoles primaires du Hainaut.* Journal of education and teaching. Numbers from 1846 to 1883. 37 vols.

211. MARTINOT, A., Nismes.—Arithmometer.

212. MINISTRY OF PUBLIC INSTRUCTION, Brussels.—(1) Elementary and Normal Schools. (2) Regulations, diagrams, samples of furniture, teaching materials. (3) Natural History and Technological Collections, models, prizes. School work. (4) Diagrams for Musical Instruction.

213. MONITOR, E. A., Brussels.—Writing Materials and Copy Books. Explanation of the course.

214. NOËL, L., Frasnes.—*Aide Mémoire* for Adults, containing the outlines of Hygiene, Natural Sciences, Belgian History, Constitutional Law. Geometrical Figures as required by the official code.

215. QUÉTIN, E., St. Gilles.—School Furniture.

216. RONVAUX, Namur.—Course of Hygiene, adapted to the Belgian Government code for elementary schools.

217. SLEEKX, D., Schaerbeek.—*De Toekomst* (the Future), a Flemish Scholastic Review.

218. SMETS, A., Molenbeek-Saint-Jean.—*L'Avenir*, Scholastic, Scientific, and Literary Review.

219. SOYER, Alost.—School for army candidates. Particulars of the organization with samples of books. Models of furniture and rooms.

220. ÉCOLE COMMUNALE, No. 13, Brussels.—(1) Class Books, Register, Programmes, Rules, &c. (2) Collections for instruction in geometry and the natural sciences.

221. WINDELS, D., Brussels.—School Furniture and Fittings, Maps, Historical Diagrams, Classical Works, Models of animals.

CLASS XLIX.

Domestic Economy and other Forms of Technical and Industrial Education for Girls.—(a) Models and Apparatus for the teaching of Cookery, House-work, Washing, and Ironing, Needlework, and Embroidery, Dressmaking, Artificial Flower-making, Painting on Silk, Pottery, &c.; (b) Specimens of School Work.

222. ÉCOLE PROFESSIONNELLE DE JEUNES FILLES, Mons.—This school offers the advantages of the half-time system, the morning being devoted to instruction and the afternoon to initiation in the calling proposed to be followed by the scholars.

223. MINISTRY OF PUBLIC INSTRUCTION, Brussels.—(1) Various objects for instruction in needlework and domestic economy. (2) Educational Diagrams, pupils' work. (3) Museum of Domestic Economy.

CLASS L.

Handicraft Teaching in Schools for Boys.—(a) Apparatus and Fittings for Elementary Trade Teaching in Schools; (b) Specimens of School Work.

224. MINISTRY OF PUBLIC INSTRUCTION, Brussels.—Boys' Manual Work.

225. WINDELS, D., Brussels.—Bench and Joiner's Tool Chest on a reduced scale for instruction in manual labour for boys' schools.

CLASS LI.

Science Teaching.—(a) Apparatus and Models for Elementary Science Instruction in Schools; Apparatus for Chemistry, Physics, Mechanics, &c.; (b) Diagrams, Copies, Text-books, &c.; (c) Specimens of the School Work in these subjects.

226. ARMAND, A. F., Mons.—Mechanical Pen or Aérograph.

227. DEVILLEE, A., Mons.—(1) One volume on the ventilation of mines. (2) Two volumes of a Treatise on Heat.

228. ÉTABLISSEMENT DE CARLSBOURG, Paliseul, Province of Luxembourg.—(1) Plans and views of this establishment and the neighbourhood; also of its fittings and educational collections. (2) Programmes, statistics, &c. (3) Professional course: collection of drawing examples, cartography, works relating to the special courses, herbariums, prepared by the scholars. Normal course: similar examples for this course.

229. LA FRATERNELLE BELGE, Brussels.—Papers, documents, and statistics, with diagrams of mortality and diseases.

230. GOSSÉ, A., & CO., Brussels.—Newspaper Map of the province of Luxembourg, with specimen of papers and various statistics.

231. MINISTRY OF PUBLIC INSTRUCTION, Brussels.—Collections relating to physics, chemistry, natural history, and (in cabinet) scholars' works, various documents.

232. NEUJEAN, A., & DELAITE, Liège.—(1) Laboratory Fittings and Apparatus. (2) Appliances for teaching electricity and the industrial arts; photographs, electrotyping, gilding, plating, nickel plating, &c. (3) Glass ware for laboratory use. (4) Mineralogical collection. (5) Products for painting on glass and porcelain.

233. RORIE, F., Forest, near Brussels.—*Bulletin Scientifique et Pédagogique de Bruxelles* (monthly review).

234. WINDELS, D., Brussels.—(1) Ethnographical Types (5 heads of various races). (2) Insect boxes with the metamorphoses. (3) Physical diagrams.

CLASS LII.

Art Teaching.—(a) Apparatus, Models, and Fittings for Elementary Art Instruction in Schools; (b) Diagrams, Copies, Text-books, &c.; (c) Specimens of Art Work, Modelling, &c., in Schools.

235. ACADEMIE DE DESSIN, Ath.—Specimens of School Works; shaded drawings; modelling.

236. BEAUJOT, CH., Liège.—Works of handwriting, copybooks, &c.

237. CLUYTPENS-SUETENS, Malines.—Imitation of Wood and Marbles for painters' schools, with specimens of work done from the examples.

238. DE CLERCQ, P., Ninove.—Drawing Works.

239. DE TAEYE, E., Cortenberg.—Drawing Works.

240. DIERCKX, J., Scherbeek.—Method of teaching Handwriting in Elementary and Normal Schools. Children's work done on this method.

241. ÉTABLISSEMENT DE CARLSBOURG, Paliseul, Province of Luxembourg.—Professional Courses. (See Class 4.)

242. **FUMIÈRE, TH.**, Schaerbeek.—(1) The Decorative Arts at the Belgian Exhibition. (2) Exhibitions and their Influence on Decorative Art. (3) A few Words on Dwellings and their Furniture. (4) Amsterdam Exhibition and Belgian at the same. (5) Means of Improving the Working Man's Lot. (6) Louvain Society for the Construction of Cheap Dwellings. (7) Frame of Designs.

243. **MINISTER OF THE INTERIOR ACADEMY OF THE FINE ARTS AND DESIGN.**—(1) Collective Exhibit formed by the Academies of Louvain, Ghent, Soignies, St. Nicolas, Malines, Termonde, Courtrai, and Lierre:—1. Elementary Instruction in Drawing; 2. Intermediate Instruction; 3. Technical Instruction. (2) Decorative Painting of Drawings relating to Sculpture, Furniture, Architecture, Masonry and Stone Cutting, Carpentry, and Joinery; Architectural Composition.

244. **ROBELUS, P.-C.**, Ghent.—Drawing Examples for Elementary and Second Grade Schools.

245. **SOUVENIER, H.**, Hasselt.—English Writing Course.

246. **SERRURE, E.-C.**, St.-Nicolas.—(1) Design for a Town School for both Sexes. (2) Design for a Village School with Drawing School. (3) Bound Atlas Course of Classical Architecture.

247. **STROESSER, J. P.**, Schaerbeek.—(1) Drawing Examples and Models. (2) Principles of Stereoscopy for elementary schools. (3) Plane and Solid Geometry. (4) Crystallography. (5) Geography and Astronomy. (6) Notice on the Solar System. (7) Planimeter Celestial Mechanism.

CLASS LIII.

Technical and Apprenticeship Schools.—(a) Apparatus and Examples used in Primary and Secondary Schools for teaching Handicrafts; (b) Models, Plans, and Designs for the Fitting up of Workshop and Industrial Schools; (c) Results of Industrial Work done in such Schools.

248. **ADMINISTRATION COMMUNALE**, Anvers.—(1) Liège Professional School. (2) Plans and Designs.

249. **ASSOCIATION POUR L'ENSEIGNEMENT PROFESSIONNEL DES FEMMES**, Brussels.—(1) Drawings and Aquarelles. (2) Ceramic and Fans. (3) Artificial Flowers. (4) Account Books. (5) Needlework and Dressmaking.

250. **ÉCOLE PRATIQUE D'HORTICULTURE DE L'ÉTAT**, Vilvorde.—(1) Plan in Relief of the Establishment. (2) Documents relative to the Schools.

251. **ÉCOLE PROFESSIONNELLE DE JEUNES FILLES**, Antwerp.—(1) Designs for Lace and Embroideries. (2) Artificial Flowers. (3) Ten Diagrams to illustrate the Manufacture of Artificial Flowers.

252. **ÉCOLE MOYENNE PROFESSIONNELLE DE DEMOISELLES**, Liège.—(1) Dresses. (2) Linen. (3) Artificial Flowers. (4) Drawing and Painting.

APPLICATION COLLECTIVE DES ÉCOLES INDUSTRIELLES ET PROFESSIONNELLES.—(1) Regulations. (2) Programmes. (3) Time Table. (4) Specimens of Certificates. (5) Library Catalogues. (6) Drawing Examples. (7) Models. (8) Photography. (9) Dyeing. (10) Weaving.

Elementary Instruction—(1) Freehand. (2) Geometrical Drawing and Flat Ornament. (3) Instrument Drawing. (4) Projection. (5) Perspective. (6) Mining and Metallurgical Drawing. (7) Building Construction. (8) Furniture. (9) Naval Construction. (10) Lace. (11) Painting. (12) Decorative Painting. (13) Weaving. (14) Dyeing, &c., with examples.

253. **ÉTABLISSEMENT DE CARLSBOURG**, Paliseul, Province de Luxembourg. (See Class 51.)

254. **DE PAW, CH.**, in religion, F. MARES-JOSEPH. (See Class 48.)

255. **LEROY, ALPHONSE**, in religion, F. MANSUY-JOSEPH. (See Class 48.)

256. **MINISTRY OF THE INTERIOR**, Brussels.—(1) Hygiene Library of the principal works on this subject, including official Belgian publications. (2) Regulations for Professional Schools in Belgium.

258. **MATHIEU, C. J.**, in religion, F. MATHIEU. (See Class 48.)

259. **PERON, J. J.**, in religion, F. MÉMOIRE. (See Class 48.)

260. **VAN DEN BROECK, P. L.**, in religion, F. MARCY. (See Class 48.)

CLASS LIV.

Schools for the Blind and for the Deaf and Dumb.—(a) Apparatus and Examples for Teaching; (b) Specimens of School Work.

261. GRÉGOIRE, E., Berchem-Ste-Agathe.—The Deaf Mute. His infirmity, cure, character, education, past life, and future.

262. ASYLUM FOR THE DEAF, DUMB, AND BLIND OF BOTH SEXES, Bruges.—(1) Various Trade Objects used in the instruction of the Deaf and Dumb. (2) Maps in Relief. (3) Books on the Subjects. (4) Physical and Intellectual Works for the Deaf and Dumb.

263. VAN DER HAEGEN, E., Schaerbeek.—Course of Freehand Drawing, with applications to the principles of ornament and drawing from nature.

264. VERSTRAETE, E.-C., Ghent.—System of Instruction for the Deaf and Dumb.

265. WELT, SCHMOELE, & CO., Antwerp.—Chamber Electric Organ.

266. WINDELS, D., Bruxelles.—(1) Desks with Stools for the Deaf and Dumb. (2) Animals in Reduced Model.

CLASS LV.

Literature, Statistics and Diagrams relating to Group VI., and to the Effects of "Cramming" and Overwork on the Young, &c.

267. DIERCKX, J., Schaerbeek.—Review of European Literature, from the point of view of practical art and hygiene.

268. EVRARD L., Brussels.—The Health of the People. (A prize work.)

269. LEBON, LÉON, Ixelles.—(1) Elementary Instruction in Belgium. (2) The War on Ignorance. (3) Social Peace. (4) History of the Education of the People, and other works.

270. LEY, F., Brussels.—Two Books on Teaching.

271. MANCEAUX, H., Mons.—(1) Belgian Library for the Diffusion of Knowledge on Science and Art. (2) Zoology, Palaeontology. (3) Modern Belgium. (4) Collection of Greek, Latin, and French Classics. (5) Elementary Education Manuals. (6) Exercises. (7) Atlases. (8) Course of Mining. (9) Heating, Ventilation, &c.

272. MINISTRY OF PUBLIC INSTRUCTION, Brussels.—(1) Literature Statistics. (2) Teachers' Library. (3) Statistical Tables and Diagrams.

CLASS LVI.

Collective Displays of School Work and Appliances. School Museums.

273. ÉTABLISSEMENT DE CARLSBOURG, Paliseul, Province de Luxembourg. (See Class 51.)

274. DIERCKX, J., Schaerbeek.—The methods of writing in general use condemned by the doctors of France, England, Germany, and Belgium.

275. MERTENS, A., Brussels.—(1) Frames. (2) Chromos. (3) Specimens of good Scholastic Work.

276. LE VESTIAIRE LIBÉRAL, Liège.—Object of the Work.

VILLE DE LOUVAIN.

CITY OF ANTWERP. (*The City of Antwerp possesses 10 Kindergartens, 25 free elementary schools, 5 paying schools.*—(1) Exhibit, illustrating the complete equipment of a Kindergarten. (2) Similar Exhibit (with plan of schools), illustrating ladies' second-grade schools. (3) Similar Exhibit, as to Kindergarten and communal schools. (4) Primary communal Schools: exhibit illustrating the instruction given in these schools, with books, plans, (5) Elementary Schools (*Ecole Primaire*): similar exhibit as to these schools.

SECTION II. SCHOLASTIC HYGIENE.

GROUP 6.

CLASS LV.

Literature, Statistics and Diagrams relating to Group VI. and to the Effects of "Cramming" and Overwork on the Young, &c.

I. OFFICIAL DOCUMENTS.

CENTRAL ADMINISTRATION MINISTRY OF PUBLIC INSTRUCTION. — (1) Publications of the Department. (2) Condition of Public Instruction, with Statistics. (3) Condition of Elementary Instruction, with Statistics. (4) Laws and Regulations Relating to Elementary Instruction. (5) Various Scholastic Institutions.

CLASS XXXIV.

Designs and Models of Improved Buildings for Elementary Schools, Infant Schools and Crèches.

II. SCHOOL PLANS.

Elementary Schools.

(6) Instructions Relating to Elementary Schools, one table. (7) Detailed Plans of Commercial Elementary Schools, selected as types from the different parts of the country. (8) Photographs. (9) Building Instructions. (10) Detailed Plans of sites for normal schools erected or to be erected at Antwerp, Bruges, Ghent, Hasselt, Jodoigne, Liège, Mons, Namur, Tournai, Verviers. (11) Photographs, giving views of schools. (12) Plans for the building and furnishing of Royal and Second Grade Schools.

CLASS XXXV.

Apparatus and Fittings for Warming, Ventilating, and Lighting Schools, School Latrines, Closets, &c.

III. HEATING, VENTILATION, AND LIGHTING.

Specimens Illustrative of this System.

(12a) Normal Teachers' School at Ghent. Plans of the System of Heating and Ventilation with hot water at low pressure. (13) *Section normale d'instituteurs à Cossia.* — A Similar Plan. (14) Ventilating Stoves in use in certain schools of the province of Antwerp.

IV. HYGIENIC AND MEDICAL SERVICE IN SCHOOLS.

(15) Inspection of Schools from a hygienic point of view. Plan of Organisation by M. Deveaux. (16) Hygienic and Medical Inspection of Schools. (17) Scholastic Hygiene. (18) Manual on First Aid in case of Accidents. (19) *Bureau d'Hygiène, Brussels.* Hygienic Inspection and Medical Service of Schools. Specimens of Documents. (20) Specimens of the *boîte de secours* deposited in the elementary communal schools at Brussels. (21) Documents relating to the Sanitary Inspection of Elementary Schools at Antwerp, Ghent, and Liège.

V. GYMNASTICS.

(22) Plans of the Gymnasium of the Normal School for Teachers, Bruges. (23) Views of the same. (24) Views of the Interior of the Gymnasium of the Normal School for Teachers at Lierre. (25) Open Air Gymnastic Exercises at the same school. (26) View of the Interior of a similar school at Liège. (27) Collection of Gymnastic Apparatus in use in Government Normal Schools. (28) Gymnastic Instruments. (29) Official Programme for Gymnastic Instruction, (1 tableau.) (30) Gymnastic Instruction. Special Training of Teaching Staff. (31) Major Docx's Manual of Gymnastic Instruction for Boys. (32) The same for Girls.

CLASS XL.

Literature, Statistics, Diagrams, &c., relating to Group IV.

VI. PUBLICATIONS RELATING TO SCHOOL HYGIENE.

(33) Belgian Works.

The List is attached to the Collection of Works exhibited.

SECTION III.

GROUP 6.—ELEMENTARY EDUCATION.

CLASS XLVII.

Crèches and Infant Schools.—(a) Apparatus and Fittings for Crèches and Infant Schools; (b) Games, Toys and Kindergarten Amusements; (c) Models and Appliances for teaching; (d) Examples of School Work.

VII. KINDERGARTEN.

(34) Teaching Organisation of Kindergarten. Preparation of Teachers' Examinations. Conferences, Programme, Time Tables, &c. (35) Documents relating to the Normal Fröbel Course. (36) Belgian Works on the Fröbel System. (37) Furniture. (38) Didactic Examples. (39) Appliances for teaching Piquage and Embroidery by Mdlle. Sadzot. (40) Toys by M. Jules Guillaume. (41) Toys for construction by means of the Prism and Cube; Specimen Box of Solids; Guide. (42) Twenty-four Pictures of Animals by Lentemann. (43) Goyer's Figures, Kind Treatment of Animals. (44) Works by Teachers in Kindergarten at Brussels. (45) Works by children in the Brussels Kindergarten. (46) Collective Exhibit of Works furnished by the Kindergartens in Alost, Binche, Blankenberge, Bruges, Brussels (Rue du Poinçon School), Charleroi, Fosses, Furnes, Ghent, Grammont, Havelange, Heyst-sur-Mer, Hoogstraten, Liège, Malines, Molenbeek-St -Jean, Péruwelz, Petit-Rechain, Seraing, Ypres, &c.

ELEMENTARY AND NORMAL SCHOOLS.

§ 1. SCHOOL FURNITURE.

Elementary Schools.

(49) Specimens of School Furniture.

Normal Schools.

(50) Specimens of furniture for normal schools.

§ 2. DIDACTIC APPLIANCES, COLLECTIONS, PREPARED BY TEACHERS AND PUPILS.

A. Calculation.—B. Metric System.—C. Geometric Figures.—D. Land Surveying.

(51) Teaching Calculation in Elementary Schools (6 arithmometers). (52) Teaching the Legal System of Weights and Measures. Collection of Weights and Measures. (53) Instruction in Geometrical Figures, Teachers' Work. (54) Instruction in Geometrical Figures, Pupils' Work. (55) Instruction in Land Surveying, Collection of Instruments.

E. Geography.

(56) Didactic Appliances for Normal Schools. (57) Collection of Atlases used in Normal Schools. (58) Stroobant's Monuments of Architecture and Sculpture in Belgium. (59) Views of Remarkable Monuments in Belgium. (60) Twenty Geographical Tables by Lehmann. (61) Works by Pupils in Normal Schools, Relief Plans, Maps. (62) Didactic Teaching common to Normal and Elementary Schools. (63) Didactic Appliances for Elementary Schools, Globes. (64) Maps, &c., on L. Genonceaux' System for Second Grade Schools. (65) Local Geography. (66) Collection of Atlases for use in Elementary Schools. (67) Relief Maps. (68) Portfolio of Maps.

F. History.

Normal and Elementary Schools.

(69) Diagram of Belgian History by Buschman. (70) By J. Gerard.

Normal Schools.

(71) Atlas of Historical Geography.

G. Intuitive, Demonstrative and Practical Teaching in the Elements of Natural Sciences and Technology.

FIRST SERIES—ZOOLOGY.

Didactic Appliances—Normal Schools.

(72) Catalogue of Collections of Zoology for a Normal School. (73) Illustrated Fauna of Belgian Vertebrata, by A. Dubois.

Elementary Schools.

(74) Typical Collection for Zoology in Elementary Schools—Skeletons, Stuffed Animals.
 (75) Collection of Insects for Elementary Schools. (76) Plates representing Natural History.
 (77) Zoological Diagrams. (78) Five Diagrams of Human Anatomy. (79) Diagrams for Teaching Natural History. (80) The National Fisheries of Belgium. (81) Synoptic Table of insectivorous Birds.

Collection of Zoology.

(82) Collections prepared by Pupils in Normal Schools. (83) Collections prepared by Teachers. (84) Collections prepared by Pupils in the preparatory course of Normal Schools.

SECOND SERIES.

(85) Industries employing animal substances—Tanning. (86) Wool. (87) Felt. (88) Silk
 (89) Beekeeping.

Third Series—Botany.

(90) Sixty Herbariums made by Pupils in Normal Schools, &c. (91) Nine Herbariums made by Teachers. (92) Thirteen Herbariums made by pupils in elementary schools. (93) Four Botanical Tables. (94) Three Plans of Botanical Gardens.

Fourth Series—Arboriculture and Agriculture.

(95) Tables made by teachers for instruction in arboriculture. (96) Four Plans for teachers' gardens. (97) Collections of agricultural instruments (reduced size). (98) Collection of grains.

Fifth Series—Industries using Vegetable Substances.

(99) Collection of various kinds of woods. (100) Hemp Industry. (101) Flax industry.
 (102) Cotton industry. (103) Straw Plaiting. (104) Winnowing. (105) Paper. (106) India-Rubber. (107) Tobacco. (108) Brewing. (109) Manufacture of Hollands. (110) Sugar Manufacture.

Sixth Series—Mineralogy. Industries employing Mineral Substances.

(111) Collection of mineralogy for use in Belgian normal schools by Professors Chalon and Malaise. (112) Collections prepared by pupils in normal schools. (113) Collections prepared by teachers. (114) Collections prepared by pupils in elementary schools.

Seventh Series—Instruction in Elements of Physics and Chemistry.

(115) Catalogue of collections for instruction in physics and chemistry. (116) Collection of physical instruments for use in elementary schools. (117) Barometer for use in schools.
 (118) Lead line, mason's level, trowel, pulleys, &c. (119) Model of lightning conductor.
 (120) Collection for teaching agricultural chemistry to adults. (121) Collection of appliances and chemical products placed at the disposition of each teacher who has followed the normal course of agriculture organized in 1883 at the State Institute of Agriculture, Gembloux.

H.—INSTRUCTION IN DRAWING.*Elementary Schools.*

(122) Black Board for practising freehand. (123) Text Books of Drawing. (124) Slates used for each of the three grades. (125) Drawing Book. (126) Collective Exhibit of Drawing Books.

Normal Schools.

(127) Black Board. (128) Appliances, with moveable planes, for studying projection.
 (129) Two steps with eight easels and stools. (130) Pedestal and model. (131) Plan and section of the drawing class-room at Bruges Normal School. (132) Models in iron wire, zinc, and plaster. (133) Collection of scholars' drawings showing gradation of the exercises. (134) Drawing Manuals. (135) Collection of diagrams for teaching the outlines of history of art.
 (136) Collective Exhibit of Scholars' Works.

I.—INSTRUCTION IN MUSIC.*Section normale d'Institutrices de Bruxelles (Rue des Vistandines.)*

(137-140) Diagrams for teaching music. (141) Formation of major and minor scales.
 (142) Copy Books. (143) Manuals.

§ 3.—ORGANISATION.

(144-154) Regulations, Programmes, Registers, and papers relating to the organisation of elementary schools.

Normal Schools.

(155-164) Similar books and papers relating to organisation.

§ 4.—PUPILS' WORKS.

Elementary Schools.

(165) Collection of copy books according to the first three standards of the code of 20th July, 1880. (166 & 167) Similar collections.

Normal Schools.

(168) Collective Exhibit of the works of male and female pupil teachers.

DOMESTIC ECONOMY AND NEEDLEWORK.

§ 1.—DOMESTIC ECONOMY.

(169) Collective Exhibit from Normal Schools for women teachers. (170) Collections of Students from the preparatory courses and work-rooms of the Normal Schools.—Numbers 145 and 174. (171) Collection from elementary schools.—Numbers 158 and 174.

§ 2. NEEDLEWORK.

Governesses' Schools.

(172) 1st Series. Exhibition from *La Section normale d'Institutrices*, Rue des Visitandines, à Bruxelles. (173) 2nd Series. Collective Exhibits from the Normal Schools of Arlon, Bruges, Brussels (Rue de Malines), Ghent, Hasselt, Liège, Louvain, Mons et Tournai. (174) 3rd Series, Collective Exhibit of students from the preparatory courses and work-rooms of the Normal School.

Elementary Schools for Girls.

(175) 4th Series. Collective Exhibit from various Belgian Schools. (176) Specimens and Appliances for teaching needlework. (177) Diagrams relating to the same.

CLASS L.

Handicraft Teaching in Schools for Boys—(a) Apparatus and Fittings for Elementary Trade Teaching in Schools; (b) Specimens of School Work.

X. INSTRUCTION IN MANUAL LABOUR FOR BOYS.

Ecole Primaire Communale No. 12, Brussels.

(178) Modelling, Joinery, Turnery, Ironwork, Locksmith's work.

Section Normale d'Instituteurs, Brussels.

(179) Woodwork, cardboard boxes.

Normale School, Lierre.

(180) Wood and wirework; study of projections.

MEANS OF IMPROVEMENT.

§ 1.—QUARTERLY CONFERENCES.

(181-186) Papers, &c., relating to this subject.

§ 2.—SHORT COURSES FOR TEACHERS.

(Held during the long vacations and lasting about a month.) (187) Instruction in Gymnastics. (188) Instruction in Drawing. (189) Instruction in the elements of the Natural Sciences. (190) Instruction in the elements of Agriculture. (191) Fröbel System. Training of Governesses. (192) Documents relating to Short Course. (193) Collection of Works on Teaching, principally for the use of the instructor.

INDEX TO EDUCATION CATALOGUE.

	PAGE
Ablett, T. R., 36 Wemyss Road, Blackheath, S.E.	21
Adams, R., 7 Great Dover Street	2
Allan Glen's Institution, Glasgow	34, 41
Allman & Son, 67 New Oxford Street, W.C.	13
Art for Schools Association, 29 Queen Street, W.C.	42
Association for the Oral Instruction of the Deaf and Dumb, 11 Fitzroy Square, W.	44
Asylum for the Blind, Glasgow	53
Atkinson, L., 121 Greenwich Road, Greenwich	18
Ayling, E., Auckland Street, Vauxhall, S.E.	3
Bacon, G. W., 127 Strand, W.C.	4, 10
Bacon, J. L., & Co., 34 Upper Gloucester Place, N.W.	2
Baptist, S. L., 65 Blackheath Road, Greenwich	18
Batchelor, H. & T., opposite West Kensington Station	21
Beck, R. & J., 68 Cornhill, E.C.	17
Bemrose & Sons, 23 Old Bailey, E.C.	13
Birmingham School Board	57
Boghandel, M., Christiania, Norway	9
Born, P., 29 Tavistock Road, W.	8
Bowes, Scott & Read, Broadway Chambers, Westminster	2
Bradford, T., & Co., 140-143 High Holborn, W.C.	3, 16
Brannon, Emma M., Hygeia Lodge, Walton Naze Park, Essex	18
Brannon, T. N., Hygeia Lodge, Walton Naze Park, Essex	40
Britannia Company, Colchester	38
British and Foreign Blind Association (The)	51
British and Foreign School Society's Kindergarten Exhibition (The)	24
British Asylum for Deaf and Dumb Females (The), Lower Clapton	46
Brocas, F. Y., 4 Mill Street, W.	20
Brock, E. P. L., 19 Montague Place, Russell Square, W.C.	1
Brothers of the Christian Schools, Institute of	72
Bruciani, D., & Co., 10 Russell Street, W.C.	21
Cassell & Co., Limited, La Belle Sauvage Yard, E.C.	13
Cetti, E., 36 Brooke Street, E.C.	17
Chambers, P. C., Lowestoft	1
Chambers, W. O., Lowestoft	4
Channon, J., 18 Newland Street, Pimlico, S.W.	32
Chapman & Hall, 11 Henrietta Street, W.C.	22
Charles, A. (Home for Little Boys)	75
Chiave, D., Municipio di Torino, Italy	1
Chubb & Sons' Lock and Safe Co., Limited, 128 Queen Victoria Street	22
Church of England Sunday School Institute, Serjeant's Inn, E.C.	28
City and Guilds of London Institute, Technical College, Finsbury	40
Clarke & Shrapnel, 37 Walbrook, E.C.	11
Clements, Jeakes & Co., 51 Great Russell Street, W.C.	2
Clerkenwell Technical Drawing School	37
Coachmakers' Company of the City of London	29
Coalbrookdale Co., Limited (The), Shropshire	22
Collins, W., & Sons, Limited, Glasgow	15, 19, 22
Committee of the Manchester Art Museum, Manchester	28
Cooper, J. R., 17 High Street, Canterbury	6
Corsan, J. R., 80 Gray's Inn Road, W.C.	12
Cost, H., Baker Street, W.	3
Cottrell, J., 21 Albemarle Street, W.	17
Cremer, W. H., 210 Regent Street, W.	6

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